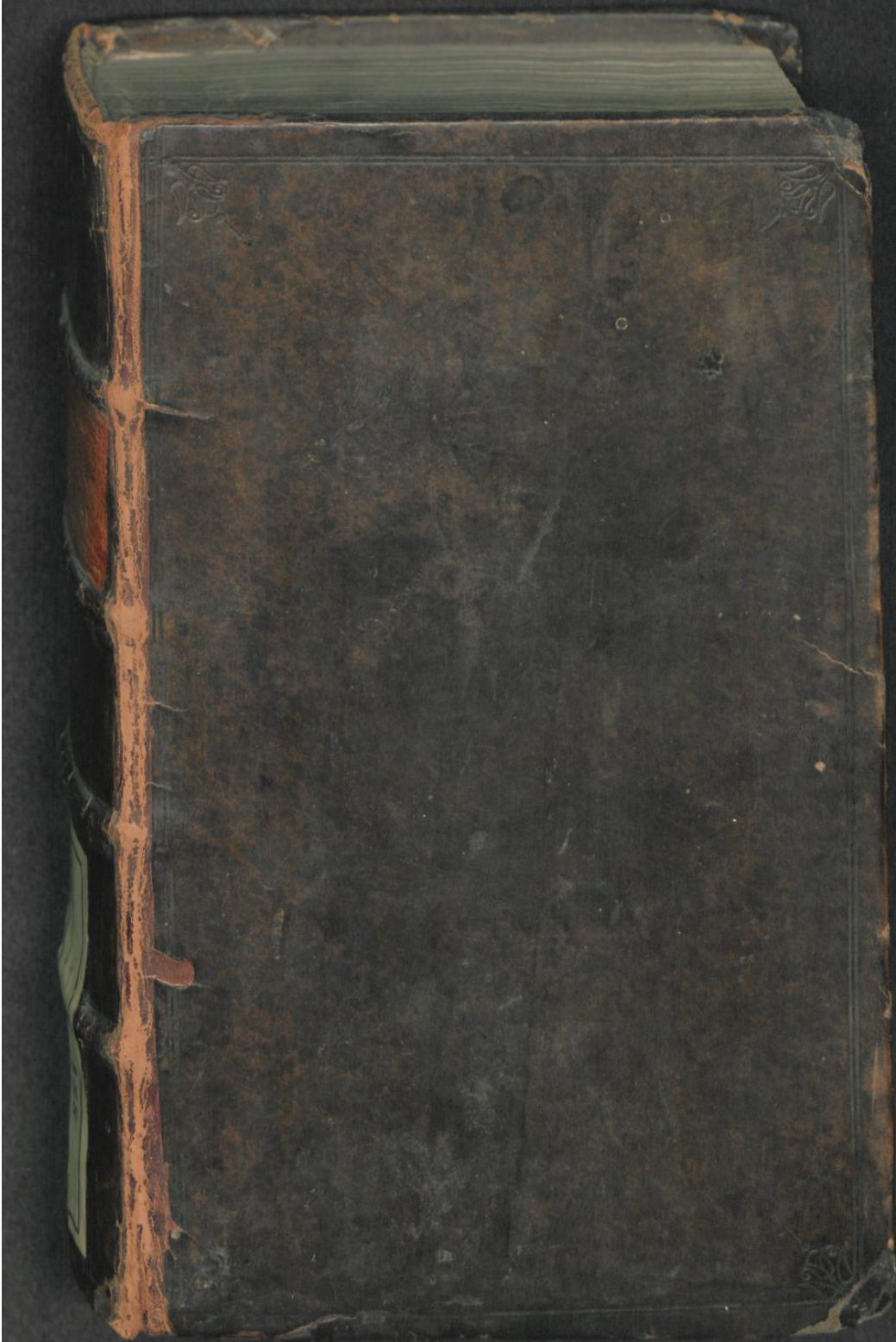


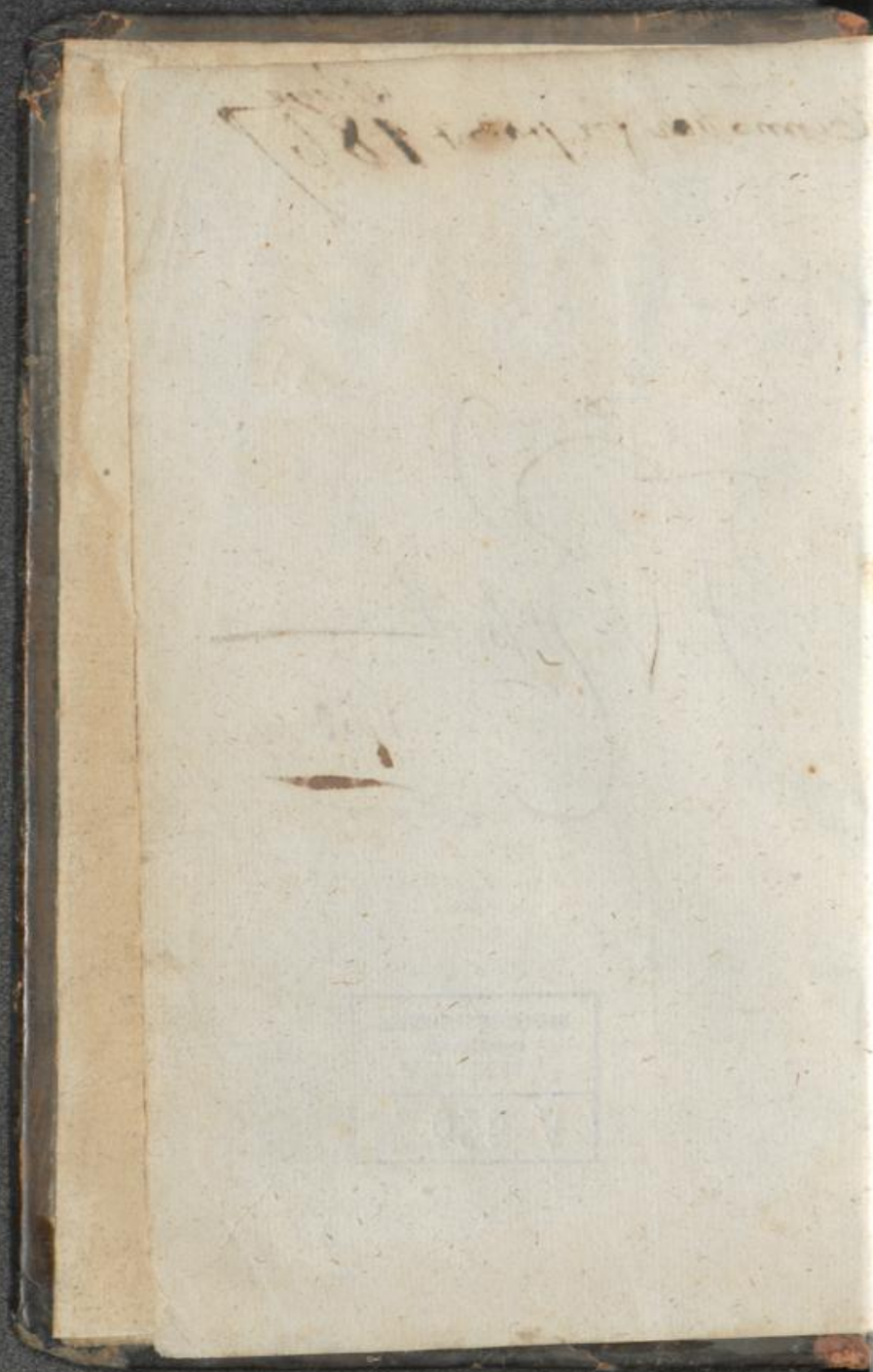


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J. Russell
1750





A
COURSE
OF
Chymistry,

CONTAINING

An easie Method of Preparing those
Chymical Medicins which are
used in *PHYSICK*.

WITH

Curious Remarks and Useful Discourses
upon each Preparation, for the benefit
of such as desire to be instructed in
the Knowledge of this ART.

By *NICHOLAS LEMERY*, M. D.

The Third Edition,

Translated from the *Eighth Edition* in the *French*,
which is very much enlarged beyond any of the
former.

L O N D O N,

Printed by *R. N.* for *Walter Kettilby*, at the
Bishop's-Head in *S. Paul's Church-yard*, 1698.

TO THE
Right Honourable
And Noble LORD
HENRY
Earl of Clarendon,
Viscount of Comberbury,
And Baron of Hindesborough.

My Lord,
I DO not presume to offer you this
as if your Lordship wanted
Books, either for serious study
or Diversion; for few Libraries in this
or any other Kingdom, are so well
furnished.

TO THE
Right Honourable
And Noble LORD,
HENRY,
Earl of *Clarendon*,
Viscount of *Cornbury*,
And Baron of *Hindon*.

My Lord,

I DO not presume to offer you this,
as if your Lordship wanted
Books, either for serious Study
or Diversion; for few Libraries in this
or any other Kingdom, are so well
A 2 furnish'd

The Epistle Dedicatory.

furnish'd with the choice of all sorts,
as your Lordship's: Nor could I
think a Translation more useful to
your Lordship, than the Original,
when the Knowledge of Languages is
amongst the meanest of your Lord-
ship's Qualifications.

My Lord, My true design is to
have an opportunity of expressing my
most humble Acknowledgments due
to your Lordship's Quality and Me-
rits, which, as they are Conspicuous
in many things, so particularly in
reference to Learning, which on all
occasions your Lordship was ready to
encourage, as well in your private as
publick Capacity.

Chymistry, Tho' it be a most use-
ful and wonderful Art, yet it has
not had the good luck hitherto of be-
ing much in Vogue, or generally
esteemed; and therefore it was some-
what necessary to Dedicate This
Course to one who knew how to va-
lue

The Epistle Dedicatory.

lue it, and whose Authority might bring it into request: And for This none could be more properly apply'd to, than your Lordship, who was carefully Educated in all the other Liberal Sciences, and early acquainted with This; which renders you most capable, both to vindicate it from the prejudices of the Ignorant, and also to deliver it from the abuses of Phantastical Men.

My Lord, I dare not undertake the just Praises, either of your Self or Family, because I am afraid of offending your Vertue and Modesty; and also, lest I should do you the same dis-service, which a rude and unskilful Painter would do to a Beauty, by offering to draw its Picture.

My Lord, I do most heartily wish the Prosperity of your Family, and the encrease of your own Happiness, both upon your own account, and to encour-

The Epistle Dedicatory.

*encourage others to imitate your
Vertues. And I do most humbly beg
the Honour of your Lordship's ac-
ceptance of this small Offering from
him, who is most ambitious to be
esteem'd,*

My LORD,

Your Lordship's

most Humble, most Obedient,

and

most Respectful Servant,

James Keill.

THE
PREFACE.

THE Two former Editions of Monsieur Lemery's *Course of Chymistry* having Sold so very well, the *Bookseller* was sufficiently encouraged to venture upon a Third, tho' nothing more had been to be added. But now he has all the reason in the World to expect his Profit and Gains by This, seeing it comes with so many more additional *Operations* and *Remarks*.

Tho' this be but the Third Edition in *English*, yet it has been Eight Times Printed in the Original; which as it proves the great Esteem and Reputation of This Book, so there needs no more to recommend this Translation to the studious in *Chymistry*, who do not understand *French*; for this is sufficient to convince them of its usefulness, and may very reasonably raise their expectations of getting from it all the instructions that are necessary to render them *Masters of this Art*.

Monsieur Lemery, as he is a most famous Chymist both for Speculation and Practice, so he is one of those to whom the *Art of Chymistry* is much indebted, having delivered it from the ill Characters and Prejudices which for a long time it lay under by the extravagant vanity of those who professed it, who thought it a debasing of their Art and Character, either to speak intel-
ligibly

THE PREFACE.

ligibly, or not to attempt things above the power of Nature, and the order which Divine Providence has established in the World. Their Language was more mystical than the Egyptian Hieroglyphicks, and it required a Man's whole time almost to learn the very *Vocabula Artis*: and the most they aimed at was the *Philosopher's Stone*, and such like Chimera's; in search of which, They generally spent both their Sense and Fortune. But in this *Treatise* there is no amusement of bombast Words, or hard nonsensical Terms: nor is there any extravagant Proposal to delude the simple out of their Wit and Money. The whole Art is laid plainly open, and is employed only in Operations that are useful; and tho' the finding out of the *Philosopher's Stone* be not undertaken here, yet the excellency of *Chymistry*, is so much set forth, as that this Art may very deservedly be called *Lapis Philosophicus*, because it sheweth how to profit by every thing, and teacheth the method of extracting the Powers, Vertues and Properties of all Substances, and to make every thing serve to other Ends and Uses than what is common.

A great part of This Translation was carried on by another: But his affairs not permitting him to go thorough with it, he imposed this Task upon me, that the *Bookseller* might not be disappointed. I did not study a too close verbal Translation, nor did I change that which *Dr. Harris* had done before, except when there was occasion to alter it: And this I can answer for, That all the Operations, and the manner of performing them are exactly set down, and that the sense of the Author, in other things, is clearly and fully declared.

The

THE PREFACE.

The method of this *BOOK* is very Natural, but if any intend either to learn or teach the Art to others, they must follow another Order; and therefore I do not think that it will be unacceptable, if I set down here Monsieur *Lemery's* own method of teaching, which I my self have been Witness to.

Commonly he runs through his *Course of Chymical Operations* in seven or eight Weeks time, and allows three or four Days each Week for his Lectures and Operations. In that Course which I was present at, he observed this Order.

First Day.

He explained the Principles of *Chymistry*, shewed his Furnaces, Vessels and Instruments, and gave their Names and Uses.

Second Day.

1. The Distillation of Wine into Brandy.
2. Distillation of the Spirit of Wine two several ways.
3. Distillation of Vinegar.
4. Purification of Saltpeter.
5. Purification of Vitriol.
6. Calcination of Vitriol.

Third Day.

7. Gilla Vitrioli.
8. A mixture for Aqua fortis.
9. A mixture for the Spirit of Nitre.
10. Preparation for the distillation of Tartar.

Fourth Day.

11. Distillation of Aqua fortis.
12. Distillation of the Spirit of Nitre.
13. Crystal Mineral.
14. Sal Polychrestum.

a

15. Distilla

THE PREFACE.

15. Distillation of Tartar.

Fifth Day.

16. Spirit and Oil of Tartar.

17. Rectification of the Spirit of Tartar.

18. Calcination of Tartar.

Sixth Day.

19. Fixation of Salt-peter by Charcoal.

20. Salt of Tartar and its purification.

21. A mixture for the Spirit of Sal Armoniack.

22. *Lapis Infernalis*, or the Caustick Stone begun.

Seventh Day.

23. Nitre fixt and purified.

24. Distillation of the Spirit of Sal Armoniack.

25. *Lapis Infernalis*, or the Caustick Stone ended.

26. Oleum Tartari per deliquium.

27. Pulvis Fulminans.

Eighth Day.

28. A mixture for Aqua Regia.

29. Tartarum Vitriolatum begun.

Ninth Day.

30. Tartarum Vitriolatum ended.

31. Tartar Soluble.

32. Sal febrifugum Silvii.

33. Distillation of Turpentine.

34. Dissolution of Gold.

35. Styptick water.

36. Lapis Medicamentosus begun.

Tenth Day.

37. Spirit and Oil of Turpentine.

38. Lapis Medicamentosus ended.

39. Distillation of Silver.

Eleventh

THE PREFACE.

Eleventh Day.

- 40. Dissolution of Bismuth.
- 41. Dissolution of Lead.
- 42. Dissolution of Copper.
- 43. A mixture for the Saffron of Mars aperitive:

Twelfth Day.

- 44. Precipitation of the Magistery of Bismuth:
- 45. Magistery of Saturn.
- 46. Sal Saturni begun.
- 47. Tincture of Copper.

Thirteenth Day.

- 48. Sal Saturni ended.
- 49. Crystal of Venus.
- 50. Calcination of the aperitive Saffron of Mars.
- 51. Mars astringent begun.
- 52. Sal Martis begun.

Fourteenth Day.

- 53. Preparation for the distillation of Sal Saturni.
- 54. Sal Martis ended.
- 55. Mars astringens ended.
- 56. Saffron of Mars ended.
- 57. Tincture of Mars begun.
- 58. Revivification of Cinnabar into Mercury.

Fifteenth Day.

- 59. Distillation of Sal Saturni.
- 60. Tincture of Mars continued.
- 61. Revivification of Mercury.
- 62. Dissolution of Mercury for making the Sublimate Corrosive.

Sixteenth Day.

- 63. Spirit of Saturn and its Rectification.
- 64. Revivification of Lead.
- 65. Tincture of Mars ended.

¶ 2

66. Tartar

THE PREFACE.

66. Tartar Martial soluble begun.

Seventeenth Day.

67. Spirit of Saturn rectified.

68. Oil of Saturn.

69. Tartar Martial ended.

70. Decrepitation of Salt.

71. A mixture for Sublimate Corrosive.

Eighteenth Day.

72. Sublimate Corrosive continued.

73. White Precipitate of Mercury.

74. Red Precipitate begun.

75. A mixture for the Regulus of Antimony.

Nineteenth Day.

76. Sublimate Corrosive ended.

77. Another Precipitate of Mercury.

78. Red Precipitate of Mercury ended.

Twentieth Day.

79. Mercurius dulcis.

80. Regulus of Antimony continued.

81. Calcination of Antimony for making the
Glas.

Twenty first Day.

82. Regulus of Antimony ended.

83. Glas of Antimony.

84. The first sublimation of Mercurius dulcis.

Two and Twentieth Day.

85. The second sublimation of Mercurius
dulcis.

86. Precipitation of the Golden Sulphur of
Antimony.

87. Mixture for the Butter of Antimony.

88. The Liver of Antimony begun.

Twenty third Day.

89. The third sublimation of Mercurius dulcis.

90. Panacea Mercurialis begun.

91. Golden

THE PREFACE.

91. Golden Sulphur of Antimony continued.
92. Distillation of the Butter of Antimony.
93. Cinnabar of Antimony.
94. The Liver of Antimony ended.

Twenty fourth Day.

95. The first sublimation of the Panacea.
96. Butter of Antimony ended.
97. Cinnabar ended.
98. Precipitation of the powder Algaroth.
99. Bezoar Mineral begun.

Twenty fifth Day.

100. The second sublimation of the Panacea.
101. Powder of Algaroth ended.
102. Bezoar Mineral ended.
103. Tartar Emetick begun.
104. Vinum Emeticum.

Twenty sixth Day.

105. The third sublimation of the Panacea.
106. Antimony diaphoretick begun.
107. Flowers of Antimony begun.
108. Salt of Mars ended.

Twenty seventh Day.

109. The fourth sublimation of Panacea.
110. Tartar Emetick continued.
111. Antimony diaphoretick and the Flowers ended.
112. Golden Sulphur of Antimony ended.

Twenty eighth Day.

113. The fifth sublimation of the Panacea.
114. Tartar Emetick ended.
115. Sal Polychrestum sibiiale.
116. Lotio Antimonii diaphoretici.
117. The Flowers of Sulphur.

Twenty ninth Day.

118. The sixth sublimation of the Panacea.

THE PREFACE.

119. The Balm of Sulphur begun.
120. Lac Sulphuris begun.
121. Spirit of Sulphur begun.
 Thirtieth Day.
122. The seventh sublimation of the Panacea.
123. Lac Sulphuris ended.
124. Balm of Sulphur ended.
125. Spirit of Sulphur ended.
 One and thirtieth Day.
126. The eight sublimation of Panacea.
127. The Oil of Cloves per descensum.
128. Preparation for the fixt Salt of Carduus
 Benedictus.
129. Flowers of Benjamin.
 Two and thirtieth Day.
130. The ninth and last sublimation of the Pa-
 nacea.
131. The fixt Salt of Carduus Benedictus ended.
132. the distillation of Roses.
133. Preparation for the distillation of Vipers.
 Three and thirtieth Day.
134. The volatile Salt of Vipers.
135. Preparation for the distillation of Wax.
 Four and thirtieth Day.
136. The Oil and Spirit of Vipers.
137. Rectification of the Butter of Wax.

Which was the last Operation he performed.

*I will trouble the Reader no further, but only
desire him to excuse the Errata's of the Printer,
and such little small slips as he may easily rectifie
himself.*

THE

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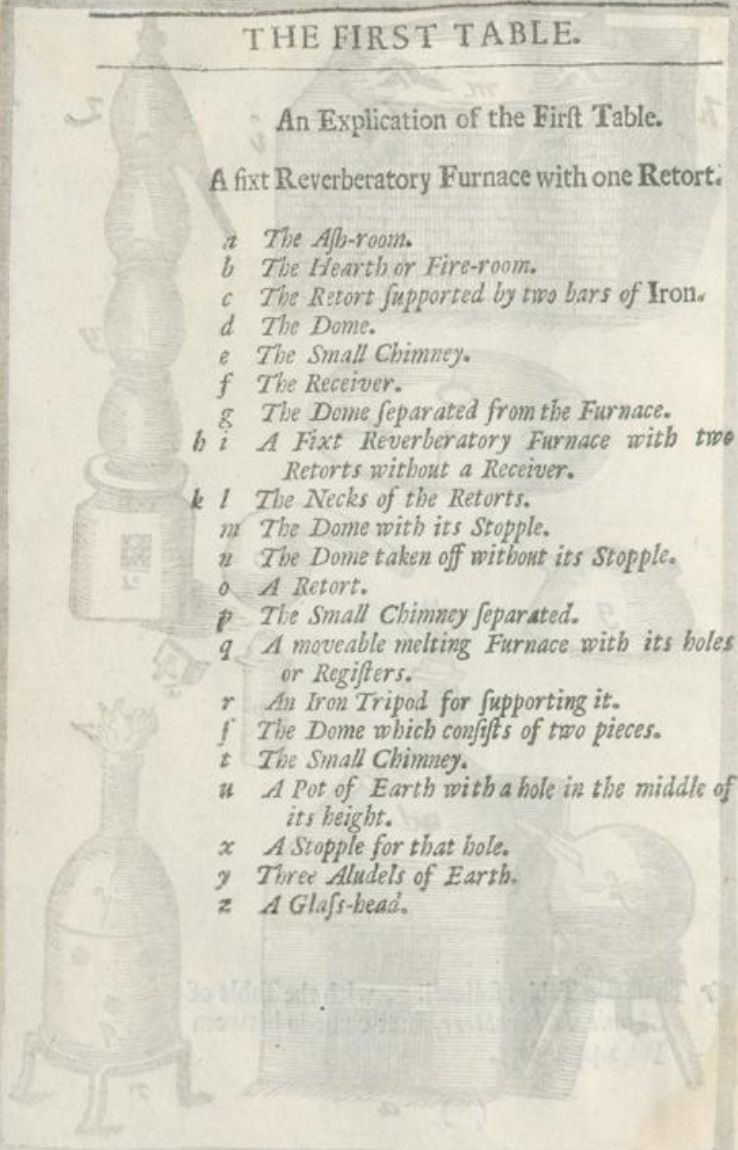
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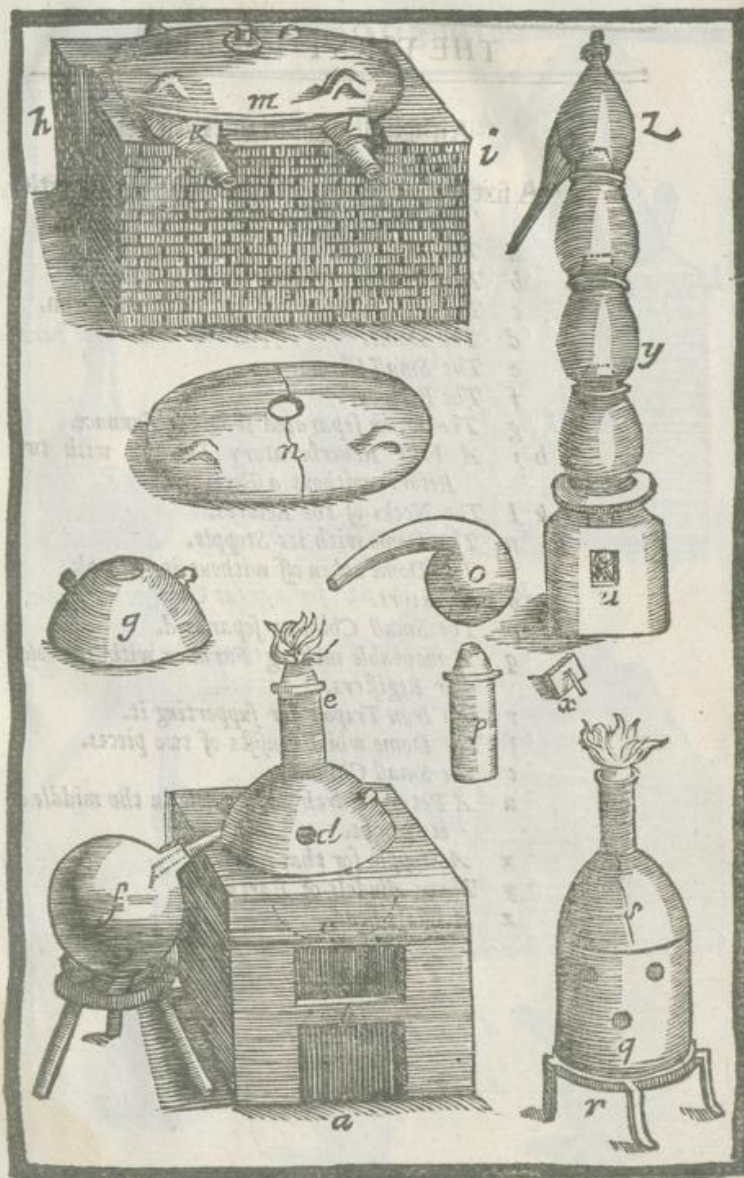
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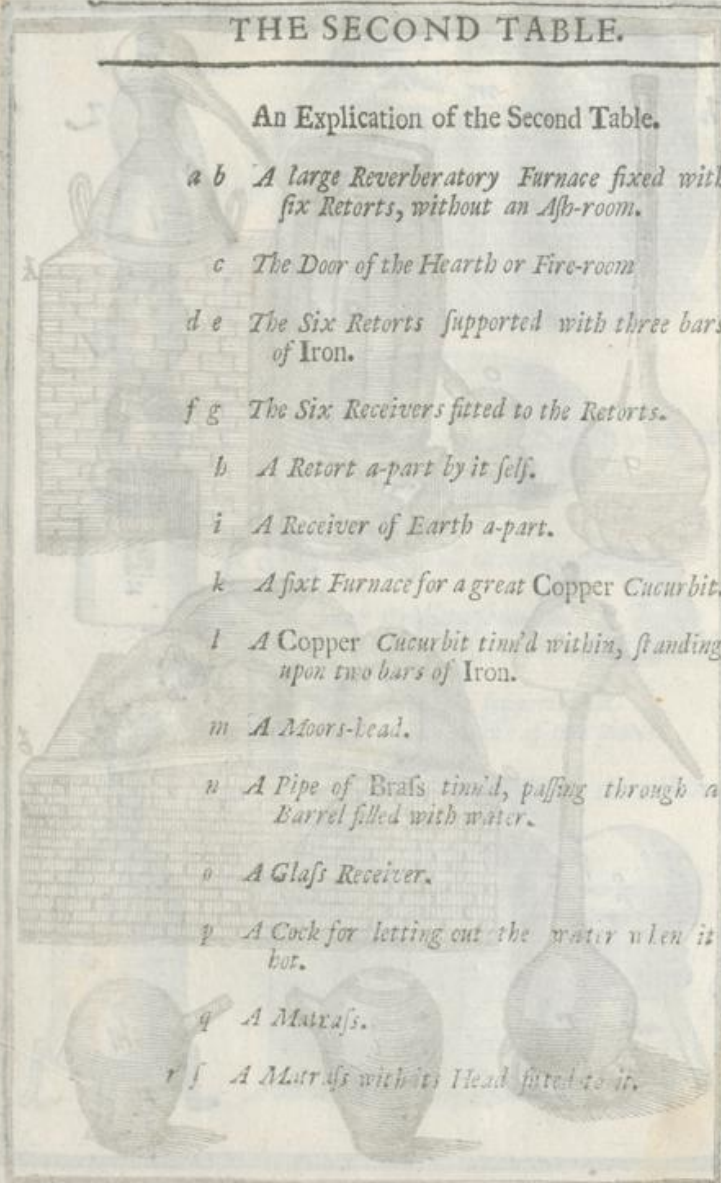
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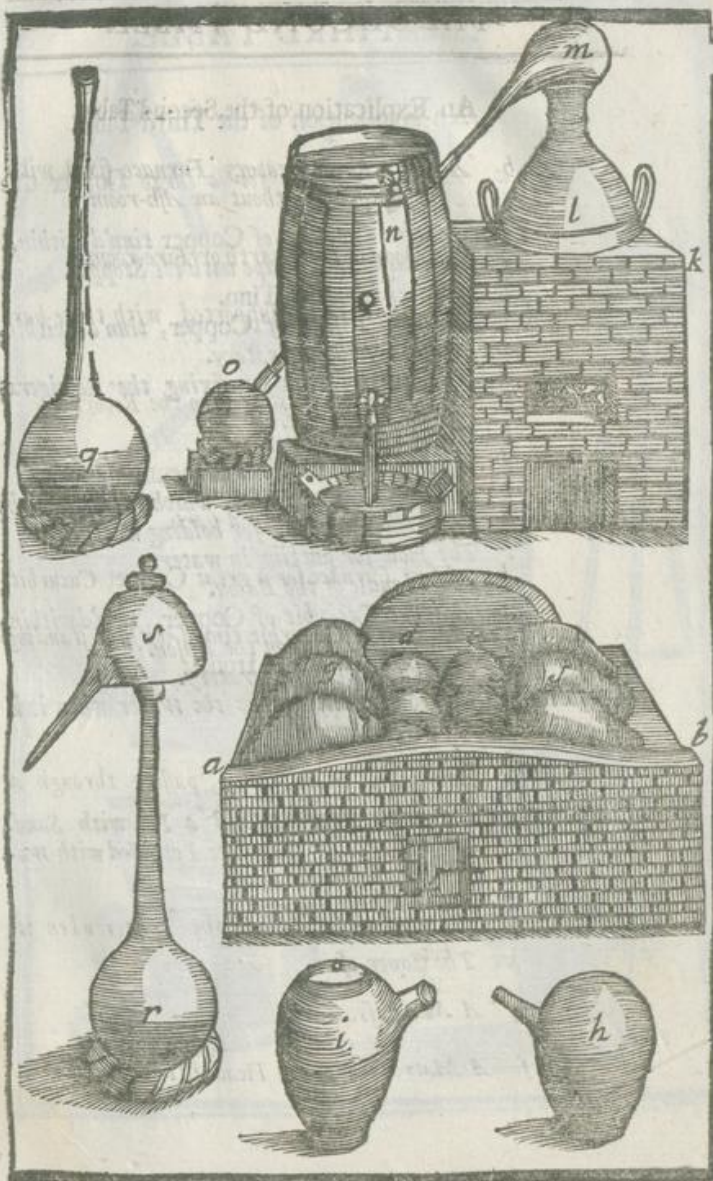
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- a* The Ash-room.
 - b* The Hearth or Fire-room.
 - c* The Retort supported by two bars of Iron.
 - d* The Dome.
 - e* The Small Chimney.
 - f* The Receiver.
 - g* The Dome separated from the Furnace.
 - h i* A Fixt Reverberatory Furnace with two Retorts without a Receiver.
 - k l* The Necks of the Retorts.
 - m* The Dome with its Stopple.
 - n* The Dome taken off without its Stopple.
 - o* A Retort.
 - p* The Small Chimney separated.
 - q* A moveable melting Furnace with its holes or Registers.
 - r* An Iron Tripod for supporting it.
 - s* The Dome which consists of two pieces.
 - t* The Small Chimney.
 - u* A Pot of Earth with a hole in the middle of its height.
 - x* A Stopple for that hole.
 - y* Three Aludels of Earth.
 - z* A Glass-head.



THE SECOND TABLE.

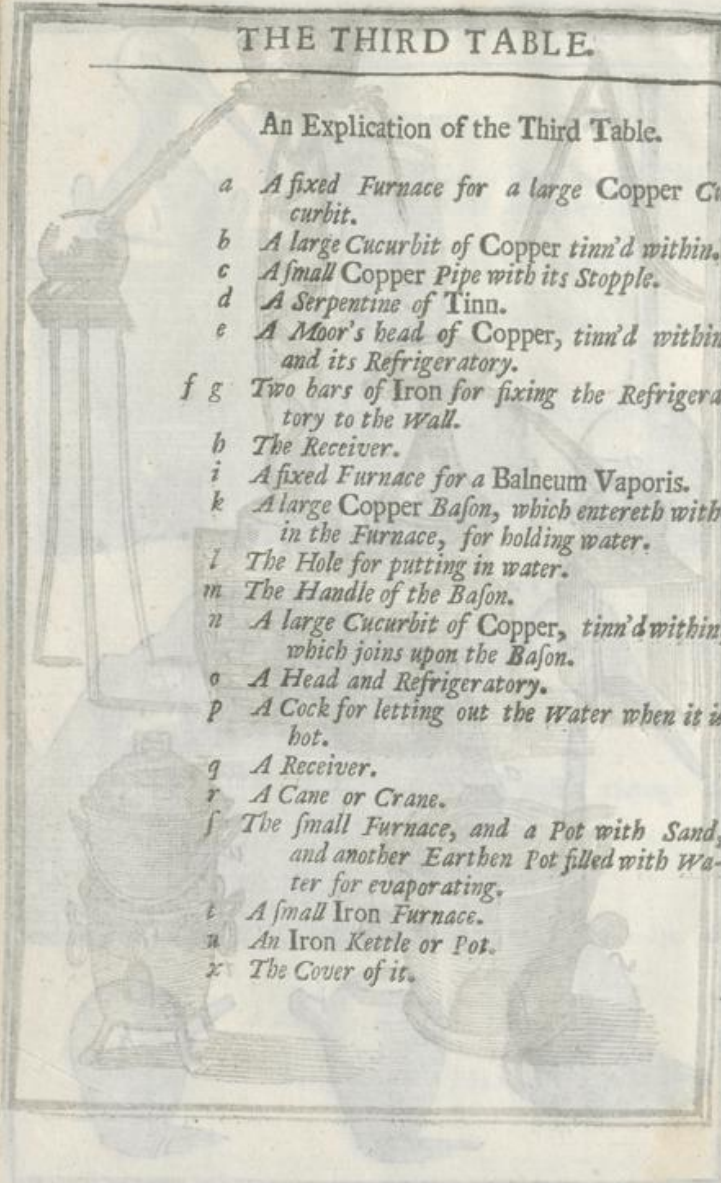
An Explication of the Second Table.

- 
- a b* A large Reverberatory Furnace fixed with six Retorts, without an Ash-room.
- c* The Door of the Hearth or Fire-room.
- d e* The Six Retorts supported with three bars of Iron.
- f g* The Six Receivers fitted to the Retorts.
- h* A Retort a-part by it self.
- i* A Receiver of Earth a-part.
- k* A fixt Furnace for a great Copper Cucurbit.
- l* A Copper Cucurbit tinn'd within, standing upon two bars of Iron.
- m* A Moors-head.
- n* A Pipe of Brass tinn'd, passing through a Barrel filled with water.
- o* A Glafs Receiver.
- p* A Cock for letting out the water when it bores.
- q* A Matrass.
- r s* A Matrass with its Head fitted to it.



THE THIRD TABLE.

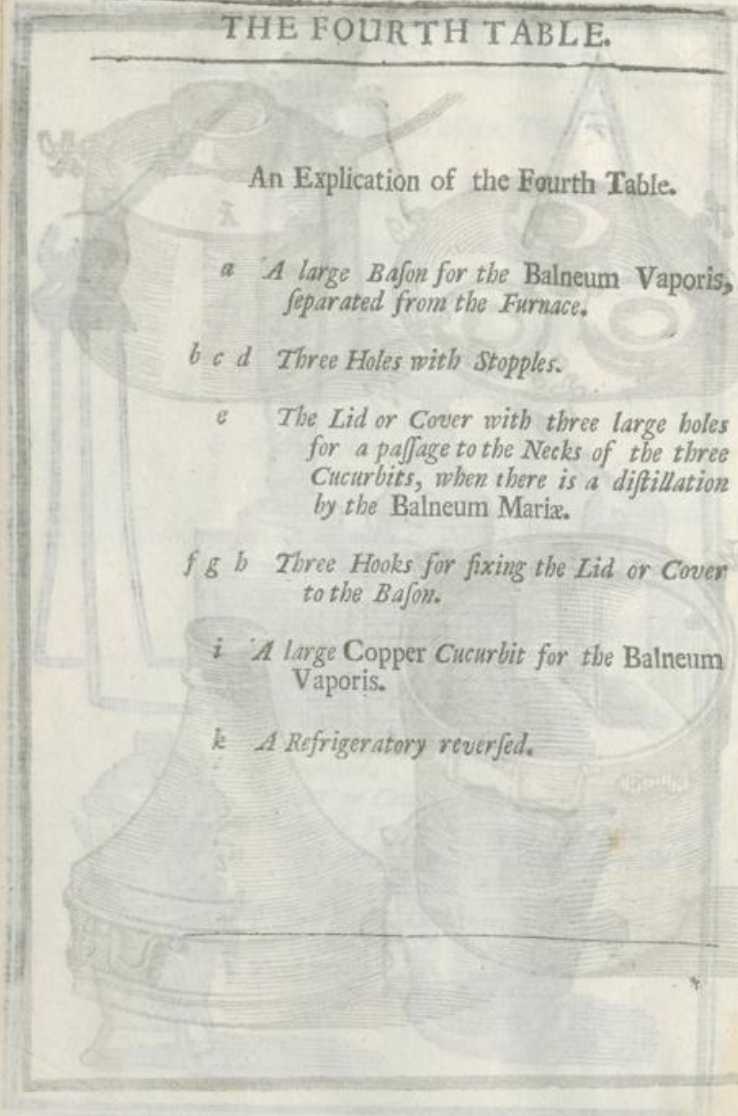
An Explication of the Third Table.

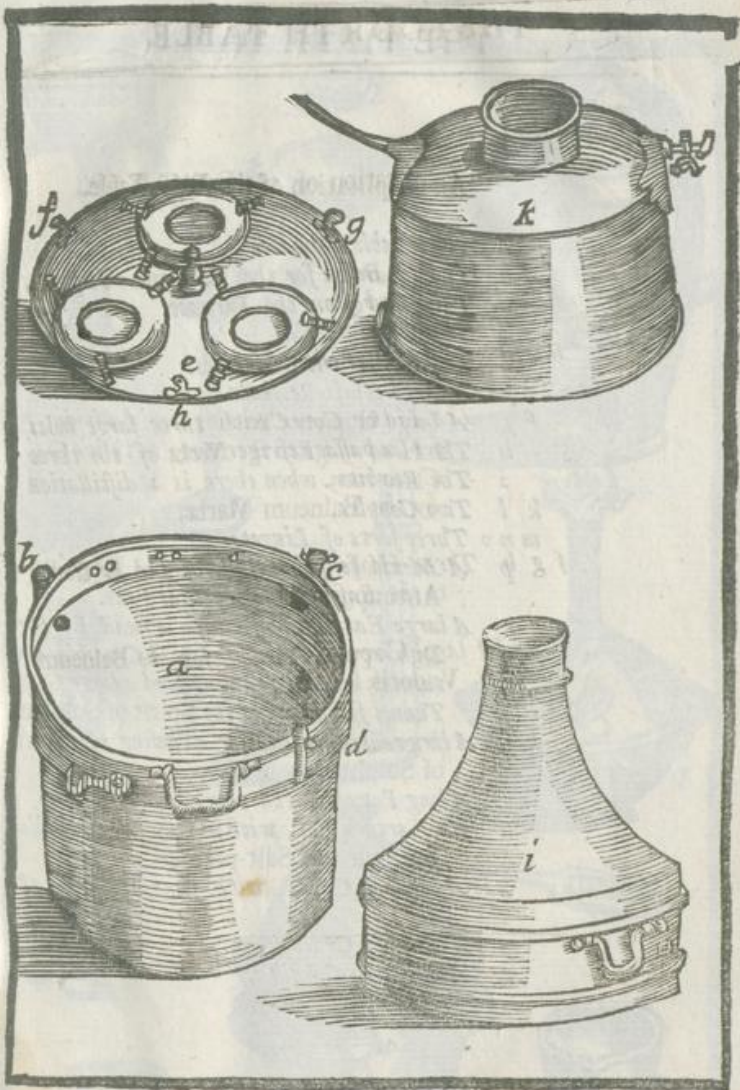
- 
- a* A fixed Furnace for a large Copper Cucurbit.
 - b* A large Cucurbit of Copper tinn'd within.
 - c* A small Copper Pipe with its Stopple.
 - d* A Serpentine of Tinn.
 - e* A Moor's head of Copper, tinn'd within, and its Refrigeratory.
 - f g* Two bars of Iron for fixing the Refrigeratory to the Wall.
 - h* The Receiver.
 - i* A fixed Furnace for a Balneum Vaporis.
 - k* A large Copper Bason, which entereth within the Furnace, for holding water.
 - l* The Hole for putting in water.
 - m* The Handle of the Bason.
 - n* A large Cucurbit of Copper, tinn'd within, which joins upon the Bason.
 - o* A Head and Refrigeratory.
 - p* A Cock for letting out the Water when it is hot.
 - q* A Receiver.
 - r* A Cane or Crane.
 - s* The small Furnace, and a Pot with Sand, and another Earthen Pot filled with Water for evaporating.
 - t* A small Iron Furnace.
 - u* An Iron Kettle or Pot.
 - x* The Cover of it.



THE FOURTH TABLE.

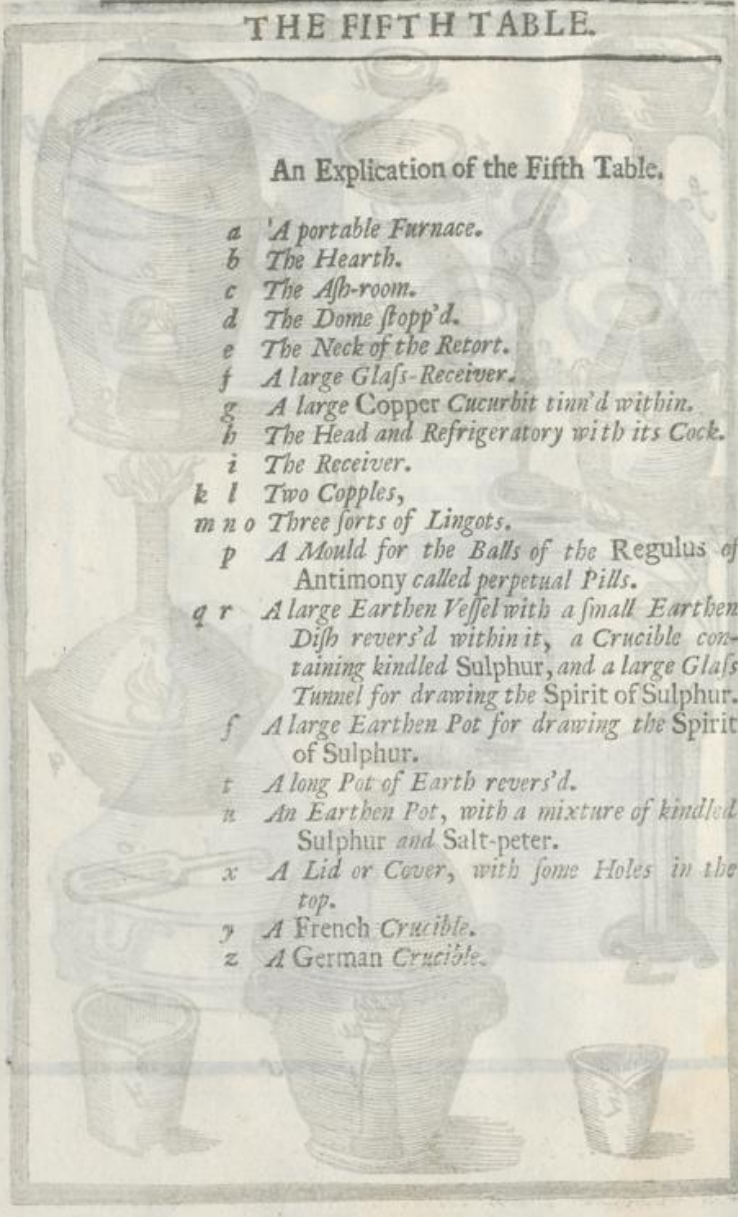
An Explication of the Fourth Table.

- 
- a* A large Basen for the Balneum Vaporis,
separated from the Furnace.
- b c d* Three Holes with Stopples.
- e* The Lid or Cover with three large holes
for a passage to the Necks of the three
Cucurbits, when there is a distillation
by the Balneum Mariæ.
- f g h* Three Hooks for fixing the Lid or Cover
to the Basen.
- i* A large Copper Cucurbit for the Balneum
Vaporis.
- k* A Refrigeratory reversed.



THE FIFTH TABLE.

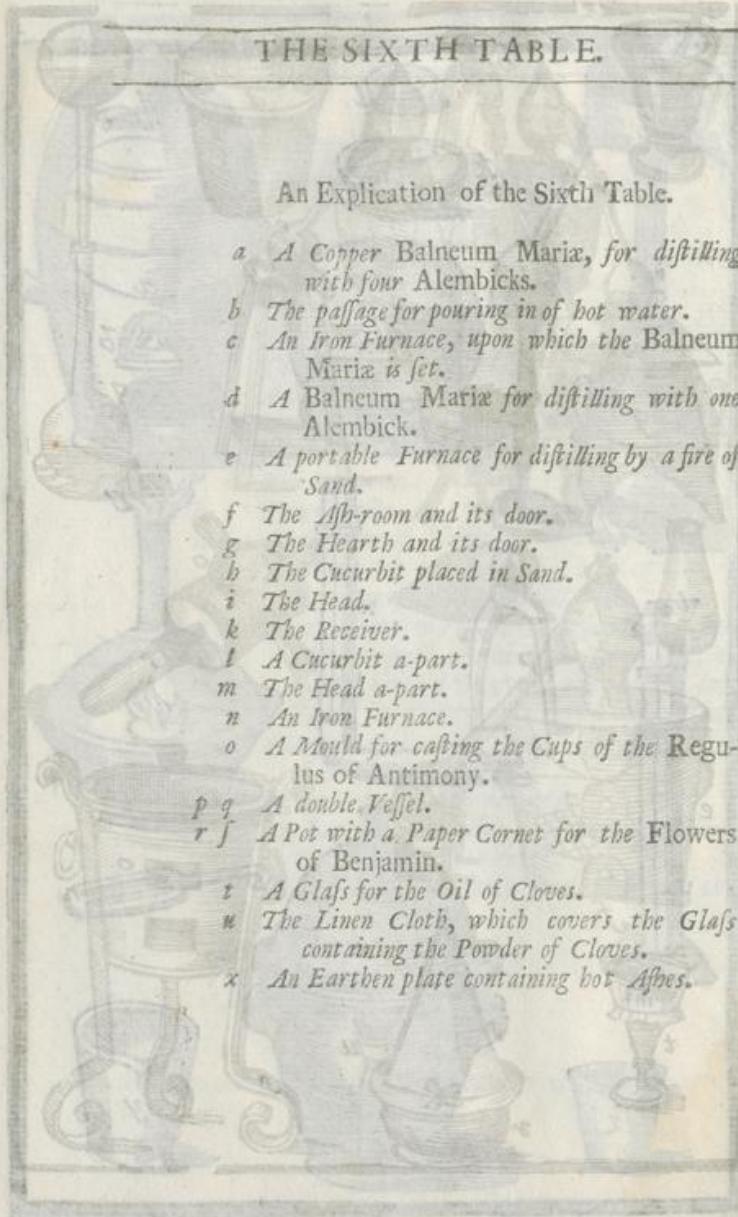
An Explication of the Fifth Table.

- 
- a* A portable Furnace.
 - b* The Hearth.
 - c* The Ash-room.
 - d* The Dome stopp'd.
 - e* The Neck of the Retort.
 - f* A large Glass-Receiver.
 - g* A large Copper Cucurbit tinn'd within.
 - h* The Head and Refrigeratory with its Cock.
 - i* The Receiver.
 - k l* Two Coppers,
 - m n o* Three sorts of Lingots.
 - p* A Mould for the Balls of the Regulus of Antimony called perpetual Pills.
 - q r* A large Earthen Vessel with a small Earthen Dish revers'd within it, a Crucible containing kindled Sulphur, and a large Glass Tunnel for drawing the Spirit of Sulphur.
 - f* A large Earthen Pot for drawing the Spirit of Sulphur.
 - t* A long Pot of Earth revers'd.
 - u* An Earthen Pot, with a mixture of kindled Sulphur and Salt-peter.
 - x* A Lid or Cover, with some Holes in the top.
 - y* A French Crucible.
 - z* A German Crucible.

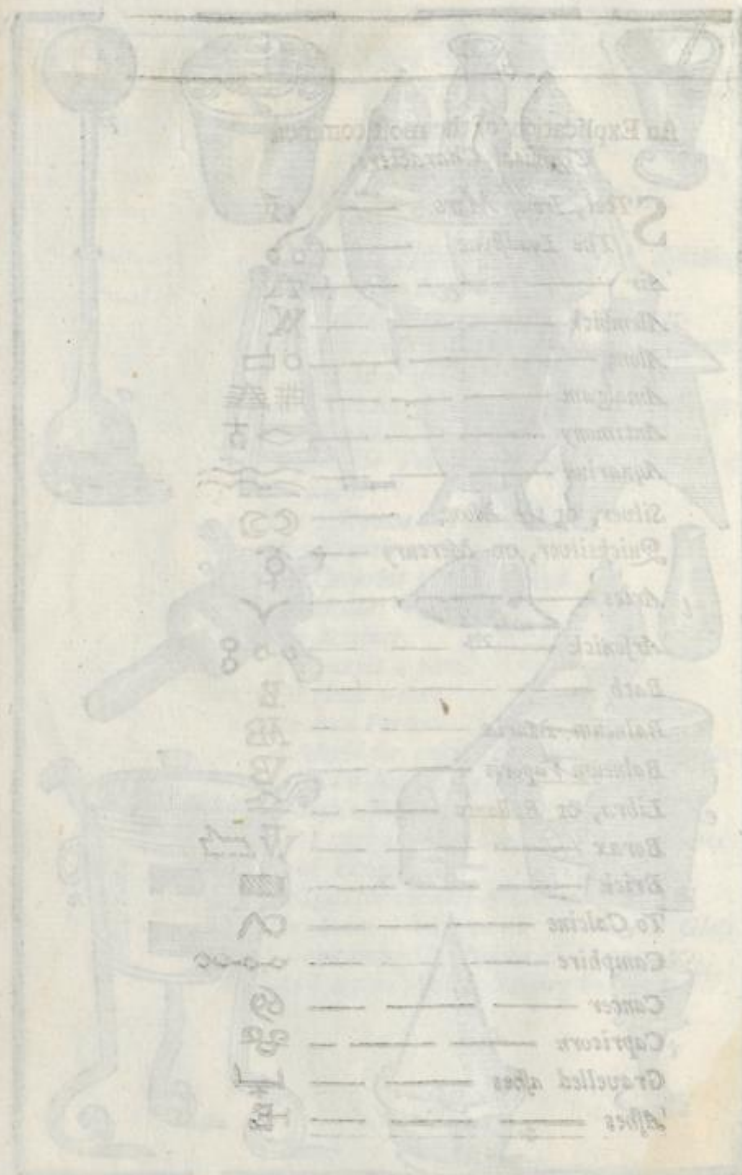


THE SIXTH TABLE.

An Explication of the Sixth Table.

- 
- a* A Copper Balneum Maria, for distilling with four Alembicks.
b The passage for pouring in of hot water.
c An Iron Furnace, upon which the Balneum Maria is set.
d A Balneum Maria for distilling with one Alembick.
e A portable Furnace for distilling by a fire of Sand.
f The Ash-room and its door.
g The Hearth and its door.
h The Cucurbit placed in Sand.
i The Head.
k The Receiver.
l A Cucurbit a-part.
m The Head a-part.
n An Iron Furnace.
o A Mould for casting the Cups of the Regulus of Antimony.
p q A double Vessel.
r j A Pot with a Paper Cornet for the Flowers of Benjamin.
t A Glass for the Oil of Cloves.
u The Linen Cloth, which covers the Glass containing the Powder of Cloves.
x An Earthen plate containing hot Ashes.





An Explication of the most common
Chymical Characters.

Steel, Iron, Mars	♂
The Loadstone	⚊
Air	△
Alembick	⚗
Alom	⚊
Amalgam	⚊
Antimony	⚊
Aquarius	⚊
Silver, or the Moon	☾
Quicksilver, or Mercury	☿
Aries	♈
Arsenick	⚊
Bath	⚊
Balneum Mariae	⚊
Balneum Vaporis	⚊
Libra, or Ballance	⚊
Borax	⚊
Brick	⚊
To Calcine	⚊
Camphire	⚊
Cancer	♋
Capricorn	♏
Gravelled ashes	⚊
Asbes	⚊

An Explication of Chymical Characters.

Cerusse	— — — —	T
Lime	— — — —	CE
Quick-lime	— — — —	Q
To Cement	— — — —	Z
Cinnabar	— — — —	♂ 33
Wax	— — — —	♂
To Coagulate	— — — —	H E
Harts-horn	— — — —	CC
A Crucible	— — — —	⊕ ∇ ▢
Crystal	— — — —	Q
Copper, or Venus	— — — —	♀
Burnt Copper, or As ustum	— — — —	♀ ⊕ CC ♂ ♂
To digest	— — — —	δ
To distil	— — — —	∫
Water	— — — —	∇ ∞
Aqua Fortis	— — — —	∇
Aqua Regalis	— — — —	∇ R
Aqua Vitæ	— — — —	♂
Spirit of Wine	— — — —	∇
Spirit	— — — —	~ Sp Sp ~ ~ ~

Tin,

An Explication of Chymical Characters.

Tin, or Jupiter	— — — — —	♁
Fire	— — — — —	△
To fix	— — — — —	☿
Wheel-fire	— — — — —	⊙
Powder of Bricks	— — — — —	☼
To filtrate	— — — — —	☼
Flowers of Antimony	— — — — —	☼
Gumm	— — — — —	☼
An Hour	— — — — —	☼
Oil	— — — — —	☼
Light, or Day	— — — — —	☼
Gemini	— — — — —	♊
Filings of Steel	— — — — —	☼
Leo	— — — — —	♌
Litharge	— — — — —	☼
Stratum super Stratum	— — — — —	☼
To Lute	— — — — —	☼
A Marcassite	— — — — —	☼
Sublimated Mercury	— — — — —	☼
Mercury precipitated	— — — — —	☼
Month	— — — — —	☼
Nitre, or Salt-peter	— — — — —	☼
Night	— — — — —	☼
Gold	— — — — —	☼

(**)

Orpiment

An Explication of Chymical Characters.

Orpiment	— — — —	☉ II
Lead	— — — —	h5xhp
Pisces	— — — —	☿
Powder	— — — —	☉ P
To precipitate	— —	☿
To Purify	— —	☿
Quintessence	— —	☿ E
Realgal	— — — —	☿ ☿ ☿
Retort	— — — —	☿ ☿
Sand	— — — —	☿
Saffron of Mars	— —	☿ ☿ ☿
Saffron of Venus	— —	☿ ☿ ☿ ☿ ☿
Sagittarius	— — — —	☿
Soap	— — — —	☿
Scorpion	— — — —	☿
Sal Alkali	— — — —	☿ ☿
Sal Ammoniack	— — — —	☿
Common Salt	— — — —	☿ ☿ ☿ ☿
Sal Gemme	— — — —	☿ ☿ ☿
Soap-weed	— — — —	☿ ☿ ☿
Sulphur	— — — —	☿ ☿
Sulphur Vivum	— — — —	☿ ☿ ☿
Black Sulphur	— — — —	☿ ☿ ☿
Philosophers Sulphur	— — — —	☿ ☿ ☿
To Sublimate	— — — —	☿ ☿

Talk

An Explication of Chymical Characters.

Talk	—	—	—	X
Tartar	—	—	—	☐ ♀ X
Earth	—	—	—	♂
Taurus	—	—	—	♂
Caput Mortuum	—	—	—	☉
Tutia	—	—	—	☉
Glass	—	—	—	☉
Verdigrease	—	—	—	☉
Wine	—	—	—	☉
Vinegar	—	—	—	☉ X
Distilled Vinegar	—	—	—	☉ X
Vitriol	—	—	—	☉
White Vitriol	—	—	—	☉
Blue Vitriol	—	—	—	☉
Urine	—	—	—	☉

A
COURSE
OF
CHYMISTRY.

Of Chymistry in general.

THE Word *Chymistry* is derived from *Etymology*
the Greek word *χυμος*, a Juice, or *of Chymi-*
from *χην*, to melt; because it teaches *stry.*
us to separate the purer substance of
mixt Bodies, which are sometimes called *Juices*;
and because it shews us how to melt things that
are of the most solid nature. Some draw it from
the Hebrew Word *Chema*, which signifies a *hot*
Constellation. But this derivation is strained too
far. The Chymists have added the Arabian par-
ticle *Al*, to the word *Chymy*, intending to give
it a sublime signification, as particularly when
the *Transmutation of Metals* is understood by it,
though otherwise *Alchymy* signifies no more than
Chymistry. It is called the *Spagirick Art*, from
σπαγην, and *αγειν*, to separate, and to gather to-
gether, because it teaches how to separate the
useful parts of a Body from the unuseful, and
how to joyn them together again: 'Tis called
the *Hermetick Art*, from *Hermes*; one of the
B first

first Inventors of it. Lastly, it has been called *Pyrotechnia*, from $\pi\upsilon\rho$ and $\tau\acute{\epsilon}\chi\eta$, signifying the *Art of Fire*; for in effect it is by *Fire* that we bring all Chymical Operations to pass. Other names have been given to this Art, but because the knowledge of them is to no great purpose, we will be contented with having related some of the chief.

The Definition of Chymistry.

Chymistry is an Art that teaches how to separate the different substances which are found in mixt Bodies: I mean by a *mixt Body* those things that naturally grow and increase, such as Minerals, Vegetables, and Animals. Under the name of *Minerals*, I comprehend the Seven Metals, Minerals, Stones, and Earths; under *Vegetables*, I understand Plants, Gumms, Rosins, Fruits, the several sorts of *Fungus*, Seeds, Juices, Flowers, Mosses, and whatsoever else comes from them. And under *Animals*, I contain both the Animals themselves, and whatsoever belongs to them, as their parts and excrements. But before I begin to speak particularly of all these things, I believe it will be convenient to say something of the *Principles of Chymistry*, and give a general *Idea* of Furnaces, Lutes, the degrees of Fire, and Terms that may occasion any obscurity.

The Objects of Chymistry.

Of the Principles of Chymistry.

An Universal Spirit.

THE First Principle that can be admitted for the composition of Mixts, is an *Universal Spirit*, which being diffused through all the World, produces different things according to the

the different Matrixes, or Pores of the Earth in which it settles. But because this *Principle* is a little *Metaphysical*, and falls not under our senses, it will be fit to establish some sensible ones; wherefore I shall relate those that are commonly held.

Whereas the Chymists in making the *Analysis* Common of mixt Bodies have met with five sorts of Sub-Principles stances, they therefore concluded that there were five *Principles* of Natural Things, *Water*, *Spirit*, *Oil*, *Salt*, and *Earth*. Of these five, three of them are Active, the *Spirit*, *Oil*, and *Salt*; and two Passive, *Water* and *Earth*. They called them Active, because, by reason of their great motion they do cause all manner of Action; and the other Passives, because being in repose themselves, they only serve to stop and hinder the quick motion of the actives.

The *Spirit* which is called *Mercury* is the first Mercury, or Spirit of mixt Bodies of the active Principles, that appears to us, when we make the Anatomy of a mixt Body. 'Tis a subtile, piercing, light substance, that is more in motion than any of the others. It is this, which causes all Bodies to grow in more or less time, according as it abounds in them more or less. But it happens that the Bodies wherein it abounds are more liable to corruption, by reason of its too great motion, and this is observ'd in Animals and Vegetables. On the contrary the greatest part of Minerals, as containing but a very small quantity of it, do seem to be incorruptible. It cannot be drawn pure, no more than the others I am going to speak of. But either it is involv'd in a little *oil*, that it carries along with it, and then may be call'd a Volatile Spirit, such as the Spirit of Wine,

B 2

of

of Roses, of Rosemary, of Juniper; or else is detained by some Salts, which check its Volatility, and then may be called a *fixt Spirit*, as the Acid Spirits of Vitriol, Alum, Salt, &c.

*Sulphur,
or Oil.*

The *Oil* which is called *Sulphur* by reason of its inflammability, is a sweet, subtle, unctuous substance that rises after the *Spirit*. This is said to cause the diversity of Colours and Smells, according to its disposition in Bodies: This gives them their Beauty, and Deformity, uniting together the other *Principles*: This also sweetens the acrimony of *Salts*, and by shutting up the Pores of a mixt, hinders it from corrupting, either through too much moisture or cold. Wherefore many Trees and Plants that have a great deal of *Oil*, are wont to last green much longer than others, and can resist the extremity of ill weathers. It is always drawn impure. For either it is mixt with *Spirits*, as the *Oils* of Rosemary, of Lavender, which swim above the water; or else it is fill'd with *Salts*, that it draws along with it in the distillation, as the *Oil* of Box, *Guaiacum*, Cloves, which do precipitate to the bottom of the water by reason of their weight.

Salt.

Salt is the last of the Active Principles, which remains disguised in the Earth, after the other *Principles* are extracted. It is a fixt, incombustible substance, that gives Bodies their consistence, and preserves them from corruption. This causes the diversity of salts, according as it is diversly mixed.

*Different
Salts.*

There are three different *Salts*, as the *Fixt*, *Volatile*, and *Essential*. The *Fixt Salt* is that which remains after Calcination: which is drawn thus, The Calcin'd matter is set to boil in much Water

Water for dissolving the *Salt*, then the dissolution is filtrated: and when all the moisture is evaporated, the *Salt* is found dry at the bottom of the Vessel. The *Salt* of Plants, drawn after this manner, is called *Lixivious Salt*: The *Volatile* is that which easily riseth, as the *Salt* of Animals: And *Essential Salt* is that which is obtained from the Juice of Plants by CrySTALLIZATION. This last is betwixt the *Fixt* and *Volatile*.

Water, which is called *Phlegm*, is the first of *Phlegm*. the Passive Principles: it comes in distillation before the *Spirits* when they are *fixt*, or after them when they are *volatile*. It is never drawn pure, but always receives some impression from the Active Principles. And this causes it to have a more deterfivive virtue in it than common *Water*. It serves to separate the Active Principles, and to bridle their motion.

The *Earth*, which is called *Caput Mortuum*, or *Caput Mortuum*, *Terra Damnata*, is the last of the Passive Principles, and can no more be separated pure than the rest, but will still retain some *Spirits* in it; and if after you have depriv'd it of them as much as you are able, you leave it a good while exposed to the Air, it will recover new *Spirits* again.

Remarks upon the Principles.

The word *Principle* in Chymistry must not be understood in too nice a sense: for the substances which are so called, are only *principles* in respect of us, and as we can advance no farther in the division of Bodies; but we well know that they may be still divided into abundance of other parts, which may more justly claim, in propriety of

The Principles of Chymistry, are not first Principles.

speech, the name of *Principles*: wherefore such substances are to be understood by *Chymical Principles*, as are separated and divided, so far as we are capable of doing it by our weak imperfect powers. And because *Chymistry* is an Art that demonstrates what it does, it receives for fundamental only such things as are palpable and demonstrable. It is in truth a great advantage to us, that we have *Principles* so sensible as they are, and whereof we can have so reasonable an assurance. The fond conceits of other *Philosophers*, concerning *Natural Principles*, do only puff up the mind with grand *Idea's*, but they prove or demonstrate nothing. And this is the reason that going to discover their *Principles*, we find some of them do frame one Systeme, and others another. But if we would come as near as may be to the *true Principles* of Nature, we cannot take a more certain course than that of *Chymistry*, which will serve us as a Ladder to them; and this division of substances, though it may seem a little gross, will give us a very great *Idea* of Nature, and the Figure of the first small Particles which have entred into the composition of mixt Bodies.

Whether
Fire be the
only cause
of the Prin-
ciples of
Chymistry.

Some modern *Philosophers* would persuade us, that it is altogether uncertain, whether the substances which are separated from Bodies, and are called *Chymical Principles*, do effectually exist and art naturally residing in the Body before: these do tell us that the *Fire* by rarifying the matter in time of distillation is capable of bestowing upon it, such an alteration as is quite different from what it had before, and so of forming the *Salt, Oil*, and other things which are drawn from it.

This

This objection does at first seem to have much weight and reason in it, because it is certain (as hereafter shall be shewn) that the *Fire* does give a very considerable impression to the preparations, and that very often it does put such a new face upon things, that they are very hardly to be known when compar'd with what they were before. But it is easie to shew, that though the *Fire* does so diversifie and alter substances, yet it does not make those *Principles*; for we see them and smell them in many bodies, before ever we bring them to undergo the *Fire*. For example, it cannot be denied, but that there was existent *Oil* in *Olives*, in *Almonds*, in *Nuts*, and in many other Fruits and Seeds, because it is drawn, only by beating and pressing them. *Turpentine*, which is a thickned *Oil*, and many other fat, or unctuous liquors, are drawn by meer incision into the trunk, or root of trees; and what else, I pray, is the *fat* of Animals but an *Oil*, or *Sulphur coagulated*? Nor can it be denied, but that there is a *Salt* actually in mixt Bodies, since that by bruiling a Plant, and making expression to draw out its juice, and then leaving the juice to settle in some cool place for a few daies, a *Salt* will be found fixt about the vessel in form of little *Crystals*.

I know that some doubting Scepticks (who make it their business to doubt of every thing) will still say, that by beating the Almonds, and then pressing them, and by making incision into Trees, the parts which compose the Plant are agitated and put in motion after such a manner as they are by *Fire*, and that this agitation of parts is capable of ranging them so, as to make the *Oil* and *Salt*. But such reasonings as these do destroy themselves

by too much niceness, and there is no sober understanding man but easily perceives the fallhood; for can a man well perceive that meer trituration or incision are able to make *Salt, Oil, Earth*? It is abundantly more probable, nay, and it may be sufficiently demonstrated, that those substances did exist in the Bodies before, and that by incision and trituration the gate has only been opened to let them come freely out.

Whether
mixt Bodies
be compounded
of the
Principles
of Chy-
mistry.

Others again do attack the *Principles* of Chymistry after another manner a little differing from this. These do acknowledge that the foresaid substances are naturally in the Mixts, much as we draw them by Art; but they assert that we have no proof that the Mixts are *compounded* of these same substances called *Principles*, and that they are not drawn from the juice of the Earth in such a form: that *Salt, Sulphur, &c.* may indeed have been formed in the natural Fermentations, and other elaborations, which happen in the Mixt, during its growth, and therefore they conclude that those substances cannot properly be called *Principles*, because we do not know sufficiently whether the Mixt was *composed* of them at first.

But since we are satisfied that the *Earths* which serve for a *Matrix* to mixt Bodies, are impregnated with *Salt, Sulphur*, and other substances of the nature of those which we do find in the Bodies, and since we can perceive nothing else which can contribute to their composition, it remains beyond all doubt that they are even *compounded* of them.

It must be granted that the *Fermentations*, or other Elaborations which come to pass in mixt Bodies, have given the *Principles* a certain order of parts, or some dispositions they had not before,

fore, but they do by no means form, or compose them.

The five Principles are easily found in *Animals* All the Principles cannot be drawn from Minerals. and *Vegetables*, but not so easily in *Minerals*. Nay there are some *Minerals*, out of which you cannot possibly draw so much as two, nor make any separation at all (as Gold and Silver) whatsoever they talk, who search with so much pains for the *Salt*, *Sulphurs* and *Mercuries* of these metals. I can believe, that all the Principles do indeed enter into the composition of these Bodies, but it does not follow that they must remain in their former condition, or can be drawn as they were before; for it may be these substances which are called Principles are so strictly involved one within another, as to suffer no separation any other way than by breaking their Figure. Now it is by reason of their Figure that they are called *Salts*, *Sulphurs* and *Spirits*: For example, if you mix an Acid Spirit with the *Salt* of Tartar or some other Alkali, the edges of the Acid will so insinuate into the pores of the *Salt*, that if by distillation you would separate the Acid Spirit again from the *Salt*, you'll never be able to effect it, the *Acid* will have lost almost all its strength, because the edges of these *Spirits* are so far destroyed or changed, that they no longer preserve their former Figure.

Every body knows that *glass* is made of *Salt*, but because the Fire hath wrought so great a change upon its Texture, or Figure, it can do nothing at all that *Salt* is used to do; nay, and it is in a manner impossible to draw any true *Salt* from it by Chymistry. Salt cannot be drawn from Glass.

There are three sorts of Liquors that are qualified with the name of *Spirit* in Chymistry; the Three kinds of Spirits. Spirit

Spirits of Animals, the Burning Spirit of Vegetables, and the Acid Spirit.

The first of them, as the spirit of Harts-horn, is nothing but a *Volatile Salt* dissolved by a little *Phlegm*, as I shall shew when I treat of Animals. The second, as the Spirit of Wine, the Spirit of Juniper, and the Spirit of Rosemary, is an exalted *Oil*, as I shall shew, speaking of Wines. And the last, as the Spirit of Vinegar, Tartar, and Vitriol, is an Acid Essential Salt, dissolved and put in fusion by the fire, as I shall prove, when I speak of Vinegar, and the distillation of Tartar: this last is called a Fluid salt.

The proper
Principle of
Chymistry
is a Spirit.

These three sorts of liquors comprehending all that can any way be called *Spirit*, this may pass for one *Principle* very well; for seeing that the *Spirit* which is drawn from Animals is nothing but a Salt dissolved by a little *Phlegm*; that Spirit of Wine is only an *Oil* exalted, and that the *Acid Spirit* is a Salt become fluid, we can observe nothing in these liquors but an *Oil*, *Salts* of a different nature, and *Water*. Wherefore it must be concluded, that the *Spirit* or *Mercury* which Chymists have talk'd of is a meer *Chimera*, that serves only to confound mens minds, and render Chymistry unintelligible; for men might if they would, have called these liquors by more proper names: thus what hindred them from calling the *Spirit of Animals*, by the name of a *Volatile salt dissolv'd*? the liquors which come from *Oils* might have been called an *exalted Oil*; and the *Acid spirits* a *Fluid salt*; and hereby we should not have been troubled about an imaginary *Principle*, and Chymistry would have been better understood.

But

But it is impossible to change a name that has been so long fixt and appropriated to these liquors. All that I can do is to explicate, as I have done, what is meant by the word *Spirit*, in order to avoid Equivocations.

Nothing but the *Oil*, can properly be said to be *Inflammable*, and the *Oil* is so much the more so, as the *Salts*, with which it is closely united, have been more or less spiritualized. For that which I call *Spirit* in the *Oil*, is nothing but an *Essential* or *Volatile Salt*; this *Salt* is not of it self *Inflammable*, but serves to *Rarifie* and *Exalt* the parts of the *Oil*, to render them the more susceptible of *Motion*, and consequently of *Flagration*; after the same manner as when *Salt-peter* is put to mix with some *Oily* substance, this *Oily* matter fires much more easily than when it is alone; though *Salt-peter* of it self is not at all *Inflammable*, as I shall prove hereafter. We have examples of the truth of what I say in *Spirit of Wine*, *Oil of Turpentine*, and all other *Inflammable Liquors*; for they are only *Oils* subtilized and refined by the *Volatile Salts* they contain. Both the *Wood* and other parts of *Vegetables* have a great deal of *Salt* much like to *Salt-peter*; this *Salt* being straitly united with their *Oil* makes them the more apt to flame, than if they had been deprived of it. The *Fat* of *Animals* as well as their other parts, is full of a *Volatile Acid salt*; *Wax*, *Rosine*, and all other matters that are *inflammable*, are impregnated with an *Acid Salt*, *Essential* or *Volatile*.

I say the *Salt* which causes the flagration of *Oils*, must be either *Volatile* or *Essential*: for if it were a *fixt Salt*, 'twould have a contrary effect, it would

*Volatile
Salt render-
eth Oil in-
flammable.*

*Fixt Salt
always the
Inflammi-
bility of oil.*

would allay in some measure the quick motion of the parts of an Inflammable body; and this we see happens when *Sea-salt* is flung into the fire, it serves to put it out. *Common Sulphur* yields us another instance of the same kind: consisting of one part Sulphureous or Oily, and another Saline or Acid fixt, which plainly appears in the opening of it, the Oily part fires, and would soon rise like other Oils into a great white flame, but that the Acid part being a load to its activity hinders it from rising, and so forces it to cast but only a small blue flame; and a proof of what I affirm may be had from mixing *Salt-peter* with *Sulphur*; for the *Volatile salt* of *Salt-peter* does *Volatilize* the *Salts* of *Sulphur*, and causes a white flame to burn violently, as I shall shew hereafter in the Operation of *Salt Polychrest*.

Some Li-
quors are
called Oils
improperly.

Many things are called Oils very improperly, as the Oil of Tartar made *per Deliquium*, the Oil of Vitriol, and the Oil of Antimony. The first is nothing else but a Salt dissolved, the second is the strongest, and most caustick part of the spirit of Vitriol, and the last is a mixture of Acid Spirit, and Antimony.

Natural
Salt.

As for *Salt*, I am apt to think, that there is one chief, of which all the rest are compounded, and do conceive it to be made of an Acid liquor sliding through the veins of the Earth, which doth insensibly insinuate and incorporate in the Pores of stones, which it does dilate and attenuate: afterwards by a long fermentation and concoction of several years, a *Salt* comes to be formed, that is called *Fossile*; and this Opinion is the more likely to be true, because from the mixture of *Acids* with some *Alkali* matter we always draw a substance very

very like unto *Salt*. Now stones are an *Alkali*. I add, that the long fermentation, and concoction which is made in the stone, serves to digest, and perfectly unite the *Acid* with the stony parts, for the making of *Salt*.

This *Fossile Salt*, which is called *Gemma*, by reason of its transparency, is found in many high Mountains of *Europe*, such as those in *Poland*, *Catalonia*, and *Persia*, and in the *Indies*; it is altogether like that we use for nourishment, which is called *Sea salt*, insomuch that the Waters of the Sea may be said to receive their saltiness from nothing else but this *Salt* dissolved in them.

Is it not likely enough that the bottom of the *Sea*, or its shores, may be much like the surface of the Earth we inhabit, and that there may be Mountains, Rocks, different sorts of earth, and consequently *inexhaustible Mountains of Salt* in a Million of places at the bottom of the *Sea*, whence it receives its brackishness?

And it may be there are Waters, which after taking *Salt* from several earths, do at last discharge themselves into the *Sea* through an infinite number of subterranean chanel, which do much contribute likewise to making *Sea-water salt*.

That which confirms me in this opinion is, because there are *Lakes* in *Italy*, *Germany*, *Egypt*, the *Indies*, and many other places, which are as *Salt* as the *Sea*, and can have no other cause but that their waters have hapned to run through *Mines of Salt*.

There are also Fountains and Wells which yield a *Salt* like to that which is called *Sal Gemme*, because the waters of these, as they passed through places full of this *Salt*, did dissolve and carry away part of it.

Origin of
Fossile Salt.

Whence the
Salt of
Fountains
and Wells.

I doubt

An Objection.

I doubt not but many will be apt to object against my opinion, That the *Sea* being of so prodigious boundless an extent, all the *Salt* I have spoken of, would not be able to salt it as it is.

Answer.

For an answer to this objection, I say, That the onely difficulty of comprehending how the *Saltiness* of the *Sea* should proceed from the *Salt* of the *Earth*, arises from this, That the many *Mines of Salt* are not so visible as the *Waters* of the *Sea*: But if it be considered, that the *Earth* is filled in many *Thousands* of places with *Salt*, through which the waters, that continually discharge themselves into the *Sea*, do pass, and consequently carry off a great deal of the same *Salt*, it may be easily understood how the *Earth* does contain *Salt* sufficient for salting the *Sea*, notwithstanding the vast quantity which still remains in it.

Moreover, it would be very difficult to shew how the saltiness of the *Sea* can otherwise happen; for, by all the ways that we see *Salt* is made, *Water* alone is not capable to produce it, tho' it be never so much heated by the rays of the *Sun*: To the production of *Salt* there must be some proportion of *Acids* and *Earth* mixed together, which cannot be supposed to be done in the *Sea*, but which may very easily happen in many places of the *Earth*, therefore we ought to conclude, That the *Salt* of the *Sea* comes from the *Earth*.

Another Question.

It may be again objected, That if the *Sea* did always receive New *Salt*, there would be a continual encrease of its saltiness, which does not at all appear.

Answer.

To this I answer, That as there is daily much *Salt* carried into the *Sea*, so there are great quantities

quantities continually evaporated by the rapid and violent beating of the Waves one against another, which doth volatilize and exalt a part of their *Salt*. Which *Salt*, being diffused through the Air, and driven together with the Clouds by the Wind, falls back again upon the dry Land, and is the cause of the fertility of many places. By this means it also comes to pass, That the *Salt* receives new *Matrixes* where it fixeth, and formeth Mines of *Sal Gemme*, whence again it is drawn off by the Waters, either into the Sea, or into Fountains, or into Lakes, so that there is a continual circulation in the World.

The Natural Circulation of Salt.

Salt-peter differs from these Salts I speak of, in that it contains more *spirit*; so that when you take the pains to exalt a part of it, what remains is like unto *Sal Gemme*.

It may be objected, That *Salt-peter* is found in places where no *acid* Liquor can be thought to come; but no body can doubt but that there is an *acid* in the Air, which though a very insensible Body, is able enough to enter into *Stones*, and *Earths*, the truth whereof is seen every day in *Earths* that have lost their *Salt* as much as could be drawn by Art, which upon being exposed some time to the open air get new additions of *Salt*, and encrease their weight considerably. Now the liquor that I speak of, which runs in some places of the Earth, receives its *acidity* from this *acid Spirit* of the Air, which condenses in some places better than in others, by reason of the coolness, or some other disposition it finds there.

I conceive therefore that *Salt-peter* is form'd in *Stones* and *Earths* by the *acid Spirit* of the Air, after the same manner as *Sal Gemme* in *Mines* by

Origin of Salt-peter.

an acid Liquor, and that this aerial acid entring insensibly into the body of *Stones* produces a *Salt* at first much like *Sal Gemme*; but afterwards new *acid Spirits* still coming and mixing with it makes it of a middle nature between *volatile* and *fixt*. And it is for this reason that a great deal of *Saltpeter* is taken from old ruined buildings, for the *stones* there continuing a long time exposed to the air, receive greater quantity of *Spirits* than other *stones*; it is likewise to be found in *Cellars* and other places where the Sun casts no heat, because the *Spirit* of the *air* does there easily condense by reason of the coolness and moisture. But I shall discourse more amply of that, when I come to treat of the Preparations that are made upon *Saltpeter*.

Origin of
other Salts.

Vitriols, *Alums*, and all other *Salts*, that are naturally found in the Earth, may be explicated upon the same Principle; for according as *acid Liquors* do meet with different earths, they produce different *Salts*.

What makes
the
Earth fer-
tile.

All *Earths* being impregnated with an *acid Salt*, as I have said, it is not hard to conceive how that the *Salt* of *Vegetables* is communicated to them from the *Earth* wherein they grew. Their growth must needs have proceeded from a *saline juice* of the *Earth* they grew in, which having opened the *Seed* through the Fermentation it caused, insinuates and filtrates into the *Fibres* that constitute the *Plant*, and the leaving grounds fallow some years, is in order to preserve and retain the *Salt* that is continually encreased in them by the *acid spirit* of the *Air*. Likewise *Dung*, and other matters, which are said to fatten and fructify *Lands*, do so by nothing else but their *Salt*. Neither need

we

we wonder at the barrenness of sandy and stony soils, for that the *acid spirit* of the Air cannot unite and fix with them in sufficient quantity to render them fertile. Nevertheless it is worth observation, that there are Lands which remain barren, through too great an abundance of *Salt* they contain: and for this reason in *Egypt* they are forced to temper their grounds with *Sand* after the ebbing of the River *Nile*, to make them Fertile; because the Earth, till that is done, is so full of *Salt*, that its Pores are quite choaked up with it. So that instead of causing any Fermentation in the *Seed*, the *Salt* fixes and depresses it, so that it can't have its motion free enough to rarify, and raise a stalk; but now when *Sand* is mingled with it, it is able to divide and separate the *Salt*, which not having then such power of fixing the *Seed*, it Ferments and rises into a *Plant*. Whence it may be seen, that *too much Salt* is at least as Offensive to the earths fertility, as *too little*, and that it is the same thing with other Fermentable matters as it is with Earths, they come to Ferment by means of a moderate quantity of *Salt* mix'd with them; for if you add too much, the Fermentation will be spoil'd.

Again, Every kind of *Salt* is not fit to fertilize Lands, it must be a *Volatile Salt*, or approaching to the nature of *Salt-peter*, to serve for Vegetation; a *Salt* too fixt would rather spoil it, and it has been observ'd that places which should fructify, have brought forth nothing, when *Sea-salt* has been sprinkled upon them; the reason of which is because this *fixt Salt* hinders the Fermentation that was necessary to fertilize.

Nevertheless it sometimes happens, that the *ashes of Vegetables*, though full of a *fixt Salt*, do serve to fertilize

Why sandy and stony ground is barren.

Fixt Salt hinders the production of Vegetables.

Why the ashes of Vegetables do fertilize

serve to *fertilize*; and this Countrey-men are well acquainted with, who in some places where they find their Lands too poor and barren to yield any thing without assistance of Art, do use at certain seasons of the year to burn *Fern* and *Turfs* upon them, and spread about the ashes. Now it is by reason of a *Lixivious Salt* in the ashes, that the *Lands* are hereby improv'd.

But this happens for the same reason as I said before, for the *sixt Salt* of *Vegetables* that lies in the ashes is very *porous*, as I shall prove hereafter; and so does very well mix with the *Spirits* or *acid Salts* of the Air, and turns easily into *Salt-peter*, as when *Spirit* of *Salt-peter* is mixt with an *Alkali Salt*, it makes a good *Salt-peter*.

As for *Sea Salt*, possibly it might happen, that if it were left in the Earth for some considerable time, it would impregnate with the *Spirit* of the Air, and so being at length *Volatilized* would render a place fertile. But because it is a very compact Body, and its parts closely united, the Volatilizing of it would be a tedious business, and so the present requisite Fermentation failing, the place would remain barren too long to gratify our expectations.

*Volatile
Salt and
Sulphur
contribute
much to
Vegetation.*

It is very likely that the *Volatile* or *Nitrous Salt* meets in the Earth with some *Sulphureous* or fat matter, that is continually raised by the subterranean heat toward the surface of the Earth, and unites with it. This mixture of a *volatile Salt* and *Sulphur* together may much contribute towards explicating the manner of *Vegetation*; for just as the mixture of *Sulphur* and *Salt-peter* does excellently dispose to an *Exaltation* by heat, which will not happen while they are separated; so the Bitumi-

nou

nous or fat part of the earth mixing with Salt-peter, which all Earths have, the subterranean heat exalts them much more easily, than if the Salt were alone. And now let us see what happens from this *Exaltation* to the production of Plants.

Some part of this *Sulphureous salt*, meeting with *seed* in the earth proper to grow, does enter into the *seed*, and cause a Fermentation, that is to say, suppling the parts of the *seed*, disposes it to open it self. Now 'tis very certain, (and what has been sensibly demonstrated by Microscopes) that each grain of *seed* contains in little the *whole Plant* with all its parts. Wherefore this opening the body of the *seed* is by reason that the *sulphureous salts* entering at the pores of the *root* of this small *Plant*, and by their Volatile quality insinuating along the Fibres which constitute the *Plant*, do orderly display before us what was before but very confused in respect of us.

These *salts* do never enter at the head of the *Plant*, and so descend to the *Root*, though often the *Root* of the *Seed* lies uppermost, and the head or stalk downwards, because the Pores of the stalk are not of such a Figure as is proper to receive them, whereas those of the *Root* have a proper contexture.

The Volatility of these *Salts* does also cause the stalk though seated downwards, to rise upwards, and follow their tendency, which is always up; and this is that which by extending and enlarging the Fibres of the *Plant*, makes it grow to that height which their nature requires.

'Tis probable that this fat part of earth insinuating with the *salt*, as I have said, does make the *Oil* of a mixt body; for we find that those matters

Whence the
Oil of Vegetables

G 2

which

which help best to fertilize, are full of *Volatile Salt* and *Oil*, as *Dung*, *Urine*, and *Plants* corrupted.

*How Salt
preserves bo-
dies.*

'Tis fit to observe here, that the *salt* does act after another-guise manner than the *Oil* in hindring the Fermentation or corruption of the matter it is mixed with; for it does not only stop the pores, and hinder the air from entering, but fixes it likewise by its hooked parts, that it can neither have motion nor rarefaction, for which reason it is that *meat* is salted in order to keep it sweet, and does thereby remain firm and compact for some time.

*Essential
Salt is Na-
tural.*

Three kinds of *salt* are drawn from *Vegetables*, an *Acid salt* called *Essential*, a *Volatile*, and a *Fixt salt*. The first is sometimes like *Salt-peter*, and sometimes like *Tartar*, according as it contains more or less earth; this *salt* is drawn from the *juice* of the *Plant*, as I said before; for after expression and purifying this *juice*, it is set in a vessel in some cool place a few daies without stirring, and the *salt* shoots into *Crystals* every way. This *Acid salt* may be said to be the *true salt* that was in the *Plant*, because the means that are used in drawing it are *Natural*, and such as cannot change its nature; but this can't be said of those others, because the violent fires that are used about them make impressions of another nature, and their effects are very different, so that the fire seems to alter and disguise them, as I shall shew in the following discourse.

*Volatile
Salt of
plants.*

The second *salt*, or the *Volatile salt* of *Plants* is usually drawn from *seeds* or *fruits* Fermented. While it remains in the *Vegetable*, it differs from the *Essential Salt* only in this, that being driven up higher by *Spirits*, it becomes more *Volatile*.
The

The *Fermentation* that is caused in fruits by beating and bruising them, does very much assist us in *Volatilizing* the salt; for it sets the particles at work, and disposes them for an easier separation; but it happens that in the great circulation, or continual motion this salt is in, it unites so strongly with the *Oil*, which Fruits and Seeds are full of, that they can't be separated by *CrySTALLIZING* the juice, as they can in drawing them from other parts of the *Plant*. We must therefore have recourse to the help of fire. The fruit or seed which contains the *Volatile salt*, as I shall prove in its proper place, is Distilled by a *Retort*, and *Water* comes forth in the first place, then an *Oil*, and lastly a most keen ill scented salt (that easily flies away) upon encreasing the fire to purpose, is driven into the *Receiver*. Now it is plain that fire has chang'd, or else added something to this salt; for when it was in the *Plant*, it had no manner of smell like that it gets by *distillation*. But to shew there's a strange alteration in this salt, as soon as it is mixed with an *Acid*, there presently appears an *Ebullition*, or *Effervescency*, which remains untill the *Acid* has thoroughly entered into the salt. Which circumstance does not happen to it in its *Natural* state, it is this *Ebullition* that gave it the name of a *Volatile Alkali*, to distinguish it from a *Fixt Alkali*, of which I shall speak hereafter. The *Chymists* will needs have this *Volatile Alkali* to be in the *Plant*, just the same as when it is drawn; that is to say, they make this a different species of salt, lying hid under the *acid*, untill it is laid open by the force of fire. But this opinion is founded on no credible experience; for Anatomize the *Plant* how you think fit, without using fire, and you shall never find any other

The fire altereth the Volatile Salt.

Of Alkali

other but an *acid salt*. Doubtless it will be said, that all other ways of dissecting *Plants* even into their *salts*, prove too weak without the assistance of this grand dissolvent Fire. But if we consider impartially how fire does act, we shall be forced to acknowledge that it rather destroys, and confounds the greatest part of the bodies it opens, and does not leave them in the *natural* state they were in before, and especially when it is driven with that force which is necessary to draw this *salt*. So that I see no reason why the *species* of things should be multiplied without necessity, by admitting many kinds of *salts* in *Plants*, and I conceive with much more probability, that the *Volatile Alkali salt* is a part of the *Acid Essential salt* I spoke of, which having been first disposed to a *Volatile* nature, and afterwards driven by the force of fire, draws along with it a portion of *Empyreumatical Oil*, that gives it such a disagreeable smell, and some terrestrious calcined matter, with which it is so strongly united, and which changes its nature, by breaking the *Saline* points, and rendring them *Porous*, so that any *acid* liquor being cast upon it, enters into the Pores, and violently divides the parts, whence follows the *Effervescency*. For the points of the *acid*, which are in continual motion, entering into the pores of this *salt*, where there is not space enough for them to move in, therefore they disperse themselves, and break the parts with violence. Perchance likewise this *Gale* or Calcined Earth may have retained igneous particles, and so the edges of the *acid* beginning to open the pores of *salt*, these little igneous bodies being in a violent motion do strike about, and break open all their small prisons, and from

from thence it may be, the violent *Ebullition* happens. Such as are prejudiced with the Sentiments of ancient *Chymists*, will relish very hardly this new Opinion of mine; but I am perswaded if any one will take the pains to examine the matter near at hand, and make some *Experiments* on the *salts* of Plants, he will find my discourse come near enough to truth.

The last *salt* or the *fixt salt* of Plants remains *Fixt Salt* mixed with the earthy part after *Distillation* of *of Plants*, the other substances; the matter is taken out of the *Retort*, and calcin'd in an open fire, for to free it from the *soot* that blackens it; afterwards the *salt* is drawn by a *Lixivium* as I have shewn before. This *salt* is called *fixt*, in comparison with others, because this cannot *sublime*.

It is observable, that because a great quantity of this kind of *salt* is drawn from a plant called *Kali*, the name *Alkali* has been given to the *fixt* *Alkali*. *The Origin of the word* *Alkali*, *salt* of all Plants; and that because an effervescency does rise upon mixing an *acid* Liquor with this *Salt*, all volatile or *fixt salts*, and all *terrestri-ous* matters which ferment with *acids*, have come to be called *Alkali's*.

The *Chymists* do assure us, but with little foundation for it, that in terrestrious Bodies, in *Metals*, *Coral*, *Pearl*, and generally in all Bodies that Ferment with *acids*, there is an hidden *Alkali* in them, which is one of the Principles of *Fermentation*, wherefore they give them the names of *Alkali's*; but because no manner of *salt* can be drawn from them: to prove their Opinion, and they have no other rational Argument to perswade me, they must give me leave to think otherwise than they have done, and I conceive that the contrary

to what they have established will serve me better to explicate the truth.

Following therefore the *Principle* I have laid, I believe that those terrestrious Bodies are themselves *Alkali's*, rather than that the *Ebullition* of *acid* and *Alkali* proceeds from a *salt* supposed to be contained in them; and further that the *salts* are never *Alkali's* until they have undergone the force of Fire, and been reduced into a *Calx*. I have proved, speaking of the nature of *volatile salt*, that the Fire did very much change the substances of things; and as I have shewn there is good reason to think there is but only one *species* of *salt* in Plants, and the *volatile salt* is but a change wrought by Fire; I shall proceed upon the same *Principle*, and affirm that there is no fixt *Alkali salt* in Plants, but that by *Calcination* the Fire has a fixt part of the *acid Essential Salt* with the earthy part that has serv'd to break the keenest of its points, and rendred them Porous, like a *Calx*. It is by reason of these Pores that this kind of *salt* grows humid, and melts so easily when exposed to the Air; and the Terrestrious parts do turn it into an *Alkali*: for if they were not mixed with it, it would continue still an *acid salt*, and opposed to *Alkali*. But to clear up this point the better, we must consider as nicely as may be the nature of an *Acid* and an *Alkali*.

Alkali
made by
Fire.

Definition
of an *Acid*.

Whereas the nature of a thing so obscure as that of *salt*, cannot better be explicated, than by admitting to its parts such figures as are answerable to the effects it produces; I shall affirm, that the *acidity* of any liquor does consist in keen particles of *salts* put in motion; and I hope no body will offer to dispute whether an *acid* has points

points or no, seeing every ones experience does demonstrate it, they need but taste an *acid* to be satisfied of it, for it pricks the tongue like any thing keen, and finely cut; but a demonstrative and convincing proof that an *acid* does consist of pointed parts, is, that not only all *acid sales* do *Crystallize* into edges, but all Dissolutions of different things, caused by *acid* liquors, do assume this figure in their *Crystallization*; these *Crystals* consist of points differing both in length and bigness one from another, and this diversity must be attributed to the keener or blunter edges of the different sorts of *acids*; and so likewise this difference of the points in subtilty is the cause that one *acid* can penetrate and dissolve well one sort of *mixt*, that another can't rarifie at all: Thus *Vinegar* dissolves *Lead*, which *aqua fortis* can't: *Aqua fortis* dissolves *Quick-silver*, which *Vinegar* will not touch; *Aqua Regalis* dissolves *Gold*, whereas *Aqua fortis* cannot meddle with it; on the contrary *Aqua fortis* dissolves *Silver*, but can do nothing with *Gold*; and so of the rest.

Different
Acids.

As for *Alkali's*, they are soon known by pouring an *acid* upon them, for presently or soon after, there rises a violent *Ebullition*, which remains until the *acid* finds no more bodies to rarifie. This effect may make us reasonably conjecture that an *Alkali* is a terrestrious and solid matter, whose pores are figured after such a manner that the *acid* points entering into them do strike and divide whatsoever opposes their motion; and according as the parts of which the *Alkali* is compounded, are more or less solid, the *acids* finding more or less resistance, do cause a stronger or weaker *Ebullition*. So we see the *Effervescency* that happens in the

Definition
of Alkali.

the dissolution of *Coral* is very much milder than that in the dissolution of *Silver*.

*Different
Alkali's.*

There are as many different *Alkali's*, as there are bodies that have different pores, and this is the reason why an *acid* will Ferment with one strongly, and with another not at all; for there must be a due proportion between the *acid* points, and the *pores* of the *Alkali*.

The nature of *Alkali's* being thus established, there will be no need of flying to an imaginary *salt* in Plants for explication of the *Effervescency*; and 'twill be easily conceived that if an *Alkali salt* is full of a terrestrious matter that renders it porous like other *Alkali's*, it must cause an *Ebullition*. That which I said, speaking of volatile *salts*, may here be added, that the igneous particles breaking in through the pores of the *Alkali salt*, wherein they became imprisoned by the Calcination, do much contribute to the raising this *Effervescency*. And really when the acid Spirit of *Vitriol*, or *Aqua fortis* is cast upon an *Alkali salt*, there happens as strong an *Ebullition*, as when this liquor is flung into the fire it self.

*Acid salts
sometimes
Alkali's.*

Acid Salts do rarely cause any *Effervescency* with acid Liquors, because their pores being very small, the common acids are not able to pierce into them; but we do sometimes meet with *acids* whose points are so fine and so proportioned to the pores of the *Salts*, that they will find an entrance even into the exceeding little pores of these acid *Salts*, and thereby cause a commotion. And then these *Salts*, although they be *acid*, yet may be called *Alkali's* in respect of such keen *acids*. This does happen to Sea-salt, which is an *acid*, for though it will make no *Ebullition*, neither with

with Spirit of *Salt*, nor with Spirit of *Niter*, nor with Spirit of *Alom*, nor with Spirit of *Vitriol*; yet if you mix it with the strongest Oil of *Vitriol*, there will rise an Effervescency. Wherefore it may be said that one acid Salt is an *Alkali* in respect of another, because there being few Bodies without some pores, few of them will prove to be impenetrable, when they meet with *acids* of an extraordinary subtlety.

The Fermentation that happens to *Dow*, to new *Wine*, and such like things, differs from that I now spoke of, in that it is more gentle, and slow; this is caused by the natural acid *Salt* contained in them, which expanding and exalting it self by its motion, does rarifie and raise up the grosser and sulphureous part which endeavours to allay its motion, from whence it comes that the matter swells up.

Of the Fermentation of Dow and new Wine.

The reason why an *acid* does not make Sulphureous things Ferment, with so much noise and suddenness as *Alkali's*, is, because that *Oils* consist of pliant parts that yield and make no resistance to the points of *Acids*, as a piece of *Wool* or *Cotton* will yield and give way to needles that are thrust into it. Thus methinks two sorts of *Fermentations* may be admitted of, the one of an *acid* with an *Alkali*, which may be called *Ebullition*, and the other, when an *acid* does by little and little rarifie some softish matter, as *Dow*, or clear and Sulphureous, as *Muske*, *Cyder*, and all other juices of Plants. This last sort may rather be called *Fermentation*.

It is further remarkable that the *acid* and *Alkali* do so destroy one another in their conflict, that when as much *acid* has been by degrees poured

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ed as is necessary to penetrate the *Alkali* in all its parts, it is then no more an *Alkali*, nor can it be so again, though you wash it to carry off the *acid*, because it has no longer that disposition of Pores which is requisite in an *Alkali*; and the *Acid* breaks and loses its points in the contest, especially when the *Alkali* is pretty compact and solid; so that if you would recover your *acid* again, you'll find it has in a manner lost all its acidity, and retains only a sharpness. But the *Sulphur* or *Oil* consisting of supple yielding parts does only receive some *acid* impression, and no such close union, so that it can be drawn from Sulphureous bodies much the same as when it was mixt.

Volatile salt of Animals. Animals do yield us two sorts of *Salt*, the one Volatile, and the other Fixt; of the first sort they yield greater quantity than of the second, because they do abound much in Spirits, which by their continual circulation do volatilize it. This *Salt* differs but little from the volatile salt of *Seeds* and *Fruits*, both which are drawn in a *Retort*; they have the same kind of smell, taste, and other virtues. The volatile salt of *Animals* keeps dry a longer time than the others, because it carries away with it more fixt salt than those others. As for fixt salt, *Animals* do yield but a very little of it, and in some *Animals* you shall find none at all; it is drawn as the fixt salt of *Plants*; they are both *Alkali's*.

No Alkali in Animals without Fire. There is no *Salt* that can be called *Alkali*, to be found in the parts, or humors of *Animals*, until they have passed the *Fire*; a Saline serosity may be observed in them, but that salt is *acid*; and it proceeds doubtless from the Aliments that are taken for nourishment. Now as I have shewn that there

there is only an *acid salt* in *Earths* and *Vegetables*, so I may say the same of *Animals*, and the rather because no other kind of *salt* can be found in them in their natural state; the *alkali salts* that are drawn from them, are only several mutations of an *acid salt*, made by Fire, which mingles with them earthly particles after the manner I have spoken of treating of the *Alkali's* of Plants. But it is observable, that whereas there is a greater proportion of Spirits in *Animals* than *Seeds*, these Spirits do serve to exalt all the *salt*; which is the reason that less *salt* is to be found in *Animals* than *Plants*.

Yet there is to be found in *Animals* a terrestrial Matter which may be called *Alkali*, because it does precipitate Bodies dissolved in acid Liquors: Thus Urine well heated does precipitate, with an Ebullition, *Mercury* dissolved by the Spirit of *Nitre*, which could never happen, unless the terrestrial matter of Urine being strongly agitated by the heat, did break the points of the Spirit of *Nitre*: And this effect ought not to be ascribed to the natural Salt of Urine, seeing in other operations it does precipitate things dissolved by *Alkali's*. As for example, *Sulphur* dissolved by *Calx* is precipitated with Urine. However, as the Salt of *Alkali* may be sometimes found in *Animals*, so we must assign the cause of it to Circulation, by which the terrestrial matter and acid Salt are closely united together, and render'd thereby porous, as is done by Fire.

As for what many do say, That *Choler* causes an Effervescency like an *Alkali*, when an *acid* is cast upon it, 'tis a mistake through want of right observation,

The substance of Alkali to be found in Animals.

observation, for no Ebullition at all happens for some time. Nevertheless I will not say, that an *acid* produces no Fermentation in *Choler*, *Bloud*, and other parts of the body, for it does very often really do that; but that is no more than uses to be done in new *Wine*, *Beer*, and other liquors of the like nature. I have already explicated this sort of *Fermentation*.

Of the
Curdling
of Milk.

We ought not to omit speaking of the *Coagulation* that's made in Milk after a *Fermentation* caused either by heat, or some *acid* put into it.

Methinks here is no need at all of supposing an Alkali salt, that ferments with the *acid* of this liquor, as many suppose for explicating this effect, since, if we consider but the natural composition of *Milk*, we shall find it to be nothing but a Creamy substance swimming on the *Serum*, and mixed only superficially with it, by the intermixture of some salt; so that it is in a fitting state of separation, as soon as the salt gains a little more motion than it had, whether it be by *Fermentation*, or by increasing its activity by an *acid* of its own nature. Thus when the heat of the Summer, or Fire has stirred up the *acid* that is in the Milk, or else some *acid* is poured into it, the edges of the *acid* do cut and divide the Creamy part, to gain a free motion in the *Serum*, and separate into *Curd* all the Butter and Cheese. Now there's nothing strange in the *Precipitation* of the *Curd*, especially when an *acid* has been poured upon the Milk, for besides the weight it gains by thickning, some part of the *acids* do mix with it, and increase its weight; for according as the *acid* that was mingled is stronger or weaker, the *Curd* does *Precipitate* more or less.

Perhaps

Perhaps some will say, for as much as *acid* is always the cause of *Coagulation* in Milk, there's no great likelihood that a salt of the same nature should be the instrument of uniting the several parts of *Milk*.

But it must be considered, that although there is an *acid* in *Milk* (as no body can doubt, seeing it sowers of it self, when stale) this *acid* is as it were imbodyed in the ramous parts of the *Oil*, so that there it loses all its motion, and cannot come to action but by rarifying the *Oil*, and making it fit to mix with the *serous* part; it is the due proportion of this *salt*, *Oil*, and *serum*, that makes the *Butter* and *Cheesy* part of Milk.

Now I hope I have said enough to establish what I have affirmed, that there's no salt in nature besides the *acid*, out of which all other Salts are made, and that the Alkaly salt has no *Natural existence* in mixt bodies. My discourse will be the better relished when I speak of the Operations of Chymistry, and you'll find that by this *Principle*, which I may call the most Natural and impartial of all that have been laid till now, I shall be able to give account of many *Phenomena's* that have never been explicated by common Principles.

The Phlegm, which is drawn from mixt bodies, is that portion of the Water wherewith the Earth was imbib'd, and which with the other Principles, concurs to their composition. It contributes much to the growth of *Bodies*, for not only it renders the Active Principles fluid, and so capable of penetrating into the Pores of matter, but also it tempers their motion, and keeps them from being dissipated. Indeed, when this abounds in any great quantity, it very much weakens the other

*Remarks
upon the
passive
Principles.*

other Principles, so that they seem (as it were) to be drown'd, but by the Art of Chymistry they may be recovered.

This Phlegm would differ nothing from Common Water, if the fire (by whose means it is separated) did not always raise with it some portion of the Active Principles, whence it is that it still retains some virtue of the mixt body from which it is extracted.

The Phlegm is that Principle which is extracted first in the distillation of those *Mixts*, whose active substances are closely united together, as in *Vitriol*, in *Nitre*, *Vipers*, *Harts-horn*, *Tartar*, and in *Plants* which are not *Odoriferous*; for it being somewhat free and loose in these, the fire does easily evaporate it, because it is a light substance. But it happens otherwise when it is mixed with *Volatile Salts*, or with the spirit of *Wine*, as also in several *Odoriferous Mixts*; for then the *Unctuous* substances, or *Volatile Saline Particles* being more subtile, are first raised by the fire.

The Earth which is drawn from *Mixt Bodies* is a part of that matter which serv'd as a *Matrix* to the other Principles: It unites, it dilates it self, and mixes closely with them; and finally is the cause of their fixation. There always arises some small quantity of this, when the other substances are sublimated through the Pores of the *Mixt* to give it nourishment. This Earth is also produced by the *Coagulation* which follows the Mixture of liquors charged with different *Salts*, as *Alkali* and *Acid*.

The Earth serves as a *Basis*, foundation, and Support to the other Principles; it is that which brings

brings them together, which unites them, and which gives to them their solidity. When the active Principles are extracted, it is called *Caput Mortuum*, or *Terra Damnata*: It has the name of *Caput* before the separation, because it contains the spirituous and essential parts of the *Mixt*, even as the head of an Animal contains its subtile Spirits: and afterwards it receives the Epithets of *Mortuum* and *Damnata*, to shew that being depriv'd of these active Spirits, it is not capable of producing any effect. But we ought to be more charitable to this poor *Earth*, and not to damn it so readily; for without doubt the rise of this Denomination was some peevish Alchymist, who not finding what he sought for in the *Earth* of *Mixts*, did load it with his malediction.

We cannot justly call the *Earth*, which is extracted from *Mixts*, *Terra Mortua*; because it is impossible to separate it purely from the other Principles, but there will be still some Tincture of them remaining: And hence it is, That all *Earths* are not alike, but do differ one from another, and may also be employed to different uses. And even tho' we could take from the *Earth* of *Mixts* all Tincture of other Principles, yet it would have its own uses; for it would be always an Alkali, fit to mortific Acids.

Of Chymical Furnaces and Vessels.

IT is not my design to relate here exactly all the kinds of Vessels and Furnaces that Artists have invented to use in Chymistry. For that
D would

would be sufficient matter of it self for a great Volume. I shall describe only those with which you will be able to perform all Operations, and send curious persons, who would be more particularly instructed in them, into the Laboratories, where they may learn more on this subject than ever they will be able to do by consulting all the Books in the World.

General division of Furnaces.

They divide Furnaces into fixt and portable. The fixt are those which are so fastned to the ground that they cannot be taken away without breaking: The portable Furnaces are such as may be transported at pleasure.

Reverberatory Furnaces.

The *Furnace* which is most in use among Chymists is that which is called the *Reverberatory*; it must be large enough to hold a great Retort, for the Distillation of acid Spirits, and other things. This *Furnace* must be fixt, and made of Brick, joyned together with a Lute compounded of one part of Potters earth, so much Horse-dung, and twice as much Sand, the whole kneaded together in Water; let it be two Bricks breadth, that the *Furnace* being the thicker, the heat may be retained the longer: let the Ash-hole be a Foot high, and the Door contriv'd, if possible, on the side that the air comes, that when you have a mind to open it, the Fire may be lighted or encreased the more easily; the fire-room need not be quite so high; you must lay a-cross it two Iron-bars of the bigness of your thumb, which will serve you to set your Retort upon; and the *Furnace* must be still raised near about a Foot higher, to cover the Retort; fit to it a Dome, or Cover, that may have a hole in the middle with its stopple, and a small Chimny a foot high, for to place upon this

this hole, when the stopple is taken out, and when you would raise a great heat; for the flame preserving it self by means of this little Chimney, it reverberates the more strongly upon the Retort. This Cover may be made of the same Paste, that I shall presently describe, speaking of Portable Furnaces.

It will be necessary to have several *Furnaces* of this same fashion; but they must be of different sizes, to work conveniently according to the bigness of the Vessel you would place in it. For that the Fire may act more vehemently upon the Retort, there must be left but only the space of a fingers breadth all round between the *Furnace* and the Retort. These *Furnaces* may also serve for Distilling by the Refrigeratory, in the Sea-Bath, the Vaporous and the Sand-bath; for you may place the Copper body upon the Iron bars, when you would distil by the Refrigeratory. It is easie to do the same with the *Balneum Mariae*. As for the Sand-bath, lay an iron or earthen pan on the bars, and put sand enough into it for to cover the bottom and sides of the Vessel you desire to heat.

There ought also to be a *Furnace* for many Retorts, which one and the same Fire may act on at once: This *Furnace* must be made as the former, but only so much larger, that the Retorts may be placed conveniently upon it, and that the Fire, in the fire-room, which hath only one door, may act equally upon all the Vessels.

If you would make this *Furnace* large enough to contain six or twelve Retorts, it must be built long-ways, and the door must be at one of the ends. I have observ'd, That in these great *Furnaces* there is no need of an Iron-grate or Ash-room,

room, in order to distillations, because they generally put in much wood, which burns sufficiently to heat the Retorts, if at the other end there be a hole, towards the Dome, big enough for ones fist, to let in the Air to the Fire, or to let out the Smoke of the Wood. A Furnace without a grate wastes less Wood and Charcoal than that which has one; so that by this means there is much less expence, especially in distillations which continue three or four days. The fire-place must be large, and above it there ought to be placed strong bars of Iron for supporting the Retorts both on the one side and the other. If the Furnace be made for twelve Retorts, it will require six bars of Iron a-cross, but three will serve, if it be only for six. The hole or passage to the fire-place must have a door of Iron made proper to shut and open, as there is occasion, for managing the Fire. It is convenient also to make a border or ledge about the Furnace, on which the Receivers may be set, as you may see in the Figure. The ordinary Retorts are not so proper for this Furnace, as those which I shall describe hereafter, whose Figure you have in the Second Table. The Receivers must be made so, that they may not take up too much room: I have given the Figures both of the one and the other in the Second Table.

Second
Table.

The Dome of this Furnace must be made of the same matter with the others, and divided into two or three pieces which may joyn easily; for if they be too great, they will be in hazard of breaking: But I have found it most convenient to make a particular Dome of Tiles at every distillation, which I place over the Retorts, and plaster

plaster with a Lute made of common ashes, sifted and moistned with Water, which Lute may be kept, after the distillation, to serve at another time, by diluting or tempering it with new Water.

As for Fusions, you must build a Furnace of the same matter and form as those spoken of before; only you must forbear laying the two Iron bars in it, that you did in the others, for support of the Vessel.

Moveable Furnaces are made of a paste that consists of three parts of broken pots in powder, and two parts of clay temper'd together with Water. Their structure is just like that of the Reverberatory Furnace. You may also leave holes through which the Iron-bars may pass, which support the Retort that they may be easily taken out, when you have a mind to use this Furnace for Fusions.

A Furnace of this form, whether fixt or moveable, may be called *Polychrest* (or general) because such a one may be used for all sorts of Operations.

It is likewise convenient for Fusions, to have a moveable Furnace of the same matter as the others; it must be round, and may be set upon a stool: it is to have only one grate, and six Registers, or holes on the sides, to let in the Air to the Fire. The Dome may be made of the same matter, for to cover it, and a small earthen Chimney for to place upon the hole of the Dome, that the Fire may keep the stronger. See the Figure of it in the First Table.

You must be sure to put sand, or broken pots, or such like things into the Paste that you use for

the building Furnaces, either fixt, or moveable, to hinder them from cracks, when they come to dry; for these matters rendring the clay more porous, the wet breaths out much the more easily.

Again, Lime and Sand tempered together, might serve for the building your fixt Furnaces, and stones might be used instead of Bricks; but because it is necessary to increase and lessen the Furnaces, to proportion their size to the Vessels you would place in them, the description which I gave before is the more convenient, for that a Man may very easily break them, and build them again, without the help of a Brick-layer.

A small
Iron Fur-
nace.

A small Iron Furnace with its Iron pot, and a cover to it, is convenient for performing many Operations; this pot may serve for a *Balneum Marie*, and for a Vaporous Bath, when there is no other. It may be likewise used to distil by an Alembick in a Bath of Sand, Ashes, or of filings of Iron. See the description of it in the Third Table.

Balneum
Marie.

A great Iron Furnace should likewise be had, whereon to place a Copper *Balneum Marie*, for to distil with four bodies at once. In the middle of this Bath there should be a pipe raised, the top of which must be made like a Funnel, into which you are to pour hot water, in place of that which consumes away in vapour. See its figure in the Sixth Table.

A common
Iron Fur-
nace with
three feet.

It is necessary to have a common Iron Furnace with three feet for warming and boiling many things upon occasion; it ought to be plaster'd with a Lute, and some pieces of Brick or Tile, to make the heat more durable. See the Figure in the Sixth Table.

As

As for Vessels, chuse them as much as may be of Earth or Glas; for it is to be feared that those which are made of Metal will communicate some particular impression to the Liquors you put into them: but because sometimes you may have occasion to distill a great many things in a little time, you may use the Copper-Cucurbit, or Body Tinn'd, because that Tinn is not so soluble as Copper, and besides hath no such pernicious quality: upon this Cucurbit place a fit head, round about which must be made a kind of bason to hold the water that cools and condenses the vapours which rise from the Matter contained in the *Vesica*, so soon as it is heated. See its description in the fifth Table.

You may likewise provide a Copper pipe tinn'd o'th' inside, which may pass sloping downwards through a vessel fill'd with water; and when you would distil Essences with it, you must fit the upper end of it to the nose of the head, and the lower end of it to the mouth of the Receiver; but you must remember to empty the water out of the vessel, according as it grows hot, for to cool the liquor that is distilling; and to this end there must be a hole made at the bottom of the vessel, to be stoppt with a wooden stopple, which may be taken out, and put in again, as often as you would let out the water.

When they distill by this pipe, they do not put water into the bason of the head which is called the Refrigeratory, and so the *Moor's head* may be even as good for this operation as the Refrigeratory.

The *Moor's head* is a Copper cap tinn'd on the inside, made like to a head. See the figure of it in the second Table.

Balneum
Vaporis.
Seeable the
third and
fourth.

It is convenient to have a *Balneum Vaporis*, which consists of three parts. The first is a great *Copper bason*, having two handles and three holes, with as many Stopples or Covers, both for preventing the bursting of it by the Rarefaction of the Water, and also for the conveniency of adding new Water, as what was put in at first is wasted by boiling. This bason is placed upon a furnace fitted purposely for it, with a proper fire, and Ash-Room, and two bars of *Iron* for supporting it. The other part of this *Balneum Vaporis* is also a great *Copper bason*, tinn'd well within, having two handles, and which is made to enter within the other even as far as a third part, that it may close it exactly; and it is fastned to it by three hooks. This Second bason hath the form of a *Cucurbit* in height. The third is a kind of *Moor's head*, tinn'd also within, with a bill, nose or pipe, and a Refrigeratory to be fitted to the second Vessel, after the usual manner. See the figures in the third and fourth Tables.

The manner
of distilling
by the Bal-
neum va-
poris.

To distill by the *Balneum Vaporis*, the matter to be distilled must be put into the second bason, which (as has been said) hath the figure of a *Cucurbit*; and the first must be fill'd half with Water; which being heated by the fire in the Furnace, the vapours which arise from the water do also heat the second bason, and consequently what is within it; and is the Cause that the moisture of this matter ascends in Vapours, and condenses into drops in the *Moor's head*, which also descend again by the Bill or Pipe of the Alembick into the Receiver which is fitted to it. Care must be taken to fill the Refrigeratory always with cold water, that the vapours which arise may

may be the sooner condensed, and that they may be preserved from a burnt smell. There is no occasion to fear, that the Plants, or other substances so distill'd, will either burn or stick closely to the Vessel.

This way of Distilling is more easy and quick than that by the *Balneum Mariæ*; because the Vapour of the water, in the lower Vessel, is hotter, hath greater force, and does sooner penetrate the Vessel about it, than the hot water it self when it touches the Vessel, as in the *Balneum Mariæ*.

The *Balneum Vaporis* is most proper for the Distillation of Odoriferous Waters, *Aqua vitæ*, the Spirit of Wine, and for extracting the Water of such thick substances as are liable to stick to the Vessel, as Frogs Spawn, Snails, the composition of Bread and Milk, and Cows Dung.

We may also use this Vessel in distilling with the *Balneum Mariæ*, if we give it a Lid or Cover, with three or four holes, for receiving the Cucurbits. See the figure in the fourth Table. This Cover is set on, and fastned to the first Bason, into which the Fountain Water is put, and as many Cucurbits as there are holes in the Lid: what you would have Distilled is put into the Cucurbits, to which Heads and Receivers are fitted; and then make a fire in the Furnace for boiling the water in the Bason, which will both heat the Cucurbits, and force the things contained in them to arise in Vapours, and to distill into the Receivers; as the water in the bason Waits, you must take care to fill it up with New: but it is necessary to warm it first, for if it be Cold, it will be ready to break the Cucurbits of Glass or Earth; the Reason is, because the pores of these Vessels which

The Balneum vaporis distills

sooner than the Balneum Mariæ.

The use of the Balneum Vaporis,

which were formerly opened by the heat, being stopt by the cold Water of a sudden, the Igneous Atomes act with violence; and not finding the free passage they had before, they do strongly dissipate the matter. There is reason to fear the like Accident, if Cucurbits of common Earth be used in place of Glas or Stone; for their Pores being much greater, the Coldness of the Water cannot so shut them as to intercept the passage of the Igneous Atomes: But we never use these sorts of Vessels for the *Balneum Mariæ*, lest their Porous matter should imbibe too much of the Best and most Spiritous substance of what is put into them to be distilled, which would take away so much of the vertue of the water that is drawn.

The Serpentine.
Table
third.

The Serpentine is a long pipe, which takes its name from its figure; because it winds and turns as it rises. It may be made of different lengths and fashions: It must be always pretty high, that only the most subtile Spirits may rise to the top. The Serpentine serves for subtilizing Spirits; because the *Phlegm* is not capable of rising by so many Turnings, as a Spirit does; and therefore it subsides to the bottom. The two Ends of the Serpentine must be made in fashion of a Tunnel, that the lower End may enter into a great Cucurbit of Brass Tinn'd within, and that the upper End may be fit to receive a head, tinn'd also within, with its Refrigeratory. A Serpentine may be either made of Tinn or Copper tinn'd; and you have the figure of it in the third Table.

The Cucurbit of the Serpentine.

The Copper Cucurbit must have near its mouth, a small pipe of the same metal, with a Stopple for drawing off the *Phlegm* which remains within by the help of a Crane without raising the

the Serpentine: see the fashion of it in the third Table. The Crane must be of Copper, and that end which goes into the Cucurbit must be shorter than the other, otherwise nothing can be drawn out. You may see also the figure of it in the third Table.

Many Retorts of different sizes are necessary in a Laboratory; those which are of Earth are convenient for the distillation of Acid Spirits, because they are able to endure the utmost degree of Fire, and will not melt, as glass do. The Vessels made of Earth have their pores as close as glass it self, and preserve the Spirits as well. They who want Earthen Vessels may coat their glass Retorts with the Lute that I shall describe hereafter, that if the glass should melt, when they are distilling Acid Spirits, the Lute may preserve the matter safe.

Retorts, see Table first.

The other sort of Retorts, which I promised to describe, are of Earth, and are made flat at the bottom; their bill or nose does not crook downwards, but rises upwards; and they are proper to be set upon the great Furnaces, when Acid Spirits are distilled: Earthen Receivers are fitted to them, and may be placed about the borders of the furnace, as you see in the second Table.

There must be also a great pot of Earth, with a hole in it for drawing the Spirit of Sulphur, as you see in the fifth Table.

Matrasses both great and small, when they are fitted to the nose of a Limbeck, are called *Receivers*; at other times we put things into them to digest: and they are also fit for sublimations. When the neck of one *Matrass* is put into the neck of another, they are called a *double vessel*, and this is done when we desire to circulate Spirits, but

Matrasses. Second Table.

Double Vessels. Sixth Table.

but then the junctures must be very well luted.
Recipients. You must also provide many large capacious *Re-*
First Table. *cipients* for the distillation of Acid Spirits by a Retort. They must be so very large, that the Spirits may have room to circulate the better.

Cucurbits
and Heads. Earthen and glass Cucurbits do serve for a great many Operations. There must also be provided heads of glass having mouths of different sizes, proportionable to the necks of the several Cucurbits and *Matrasses*.

Lingots. *Lingots* are Iron molds of divers shapes, into
Fifth which melted Metals are wont to be poured, in
Table. order to harden in the form that we would have them. That which is used for the making *Lapis infernalis* must consist of two pieces joyned together with two little Iron rings, and the melted matter is poured into the upper part of it. See its Figure in the Fifth Table.

Coppels. *Coppels* are porous vessels made in form of a cup, to be used for the trying and purifying of Gold and Silver. They are made of Ashes well washt, or of bones calcined. See their Figure in the Fifth Table.

Ashes deprived of their Salts are rather used than others, for the composition of this sort of vessels, that they may be made the more porous, by such deprivation. See the Chapter concerning *Purification of Silver by the Coppel*, and the *Remarks* upon it.

Many glass Funnels great and small, Viols of glass, Crucibles, Pans, Mortars of glass or stone, or Marble or Iron, must not be forgotten.

Aludels. *Aludels* must also have a place there; they are
First Table. Pots without a bottom, joyned together, and are placed over another Pot with a hole in the middle, to serve for Sublimations. *of*

Of Lutes.

THE Fire is often raised to so high a degree as will melt glass Retorts in a Reverberatory Furnace; wherefore it will be convenient to coat them over with such a Lute, as when dry is able to preserve and contain the matter that is put into them to be distill'd. This Lute may be made after the manner which follows.

Take Sand, the dross of Iron, Potters earth in powder, of each five pounds, horse-dung cut small a pound, glass beaten into powder, and Sea-salt, of each four ounces; mix them all, and with a sufficient quantity of water make a Paste or Lute, with which you must coat the Retort all round, to half its neck, and so set it a drying. This same Lute will serve to stop close the junctures of the neck of the Retort with the Recipient; but because when it dries, it grows exceeding hard, and it proves difficult to unlute it, it is needful to wet it with wet clothes, when you would take the Retort a-sunder from the Receiver.

The Lute that I commonly use my self for such occasions, is compounded only of two parts of Sand, and one of clay tempered together with water.

If you would have a Lute to separate easily when the Operation is done, you must temper fine and well powder'd ashes in water, and make a Paste of it: But this Lute is much more porous than the former, and it may serve as often as you please, only by tempering it over again with water.

As

As for the conjunction of Limbeckes, ordinary Glue upon paper will serve turn: but when something very spirituous is distilled, such as the Spirit of Wine, use a wet Bladder, which carries a Glue along with it, that sticks very well. But if the bladder happens to be eaten or corroded by the Spirits, have recourse to the following Glue.

Take Flower, and Lime slackt, of each an ounce, Potters earth in powder half an ounce, mix them, and make a moist Paste with a sufficient quantity of the whites of Eggs well beaten before hand with a little water. This Paste may likewise serve to stop the cracks that happen in glass vessels, there must be three lays of the Paste bound on with paper.

*To Seal
Hermeti-
cally.*

To Seal Hermetically, is to stop the mouth or neck of a Glass-vessel with a pair of Pincers heated red hot. To do this, the neck is heated by little and little with burning coals, and the fire is increased and continued, until the Glass is ready to melt. This way of sealing a Vessel is used, when you have put some matter within it that is easie to be exalted, and you have a mind to make it Circulate.

Of the Degrees of Fire.

TO make a Fire of the First Degree, two or three coals lighted will suffice to raise a most gentle heat.

For the Fire of the Second Degree, three or four coals will serve, to give such a heat as is able

able sensibly to warm the Vessel, but so as a hand may be able to endure it for some time.

For the Fire of the Third Degree, you must cause heat enough to make a Pot boil, that is fill'd with five or six quarts of water.

For the Fourth Degree, you must use Coals and Wood together, enough to give the most extreme heat of all.

The Fire of Sand, of the filings of Iron, and of Ashes, is made, when the Vessel that contains the matter that is to be heated is covered underneath and on all sides with Sand, or the filings of Iron, or with Ashes; this is done to heat the Vessel the more gently.

All these Fires have their Degrees, but the Ash-fire is the mildest, because the Ashes cannot contain so great a heat as the others.

The Reverberatory Fire is made in a close Furnace, that the heat or flame which always tends upwards, may reverberate or return upon the Vessel which is placed on two Iron bars. This fire hath its Degrees, but may be raised to a greater violence than the rest.

The Wheel-Fire for Fusion, is made when with lighted coals you encompass all round a Crucible, that holds the matter you desire to melt.

The *Balneum Marie* is, when an Alembick containing the matter that is to be heated, is placed in a Vessel filled with Water, under which the Fire is made; thus the water growing hot, heats the matter contained in the Alembick.

The Vaporous Bath is, when a Glass Vessel containing some Matter is heated by the vapour of hot water.

Expli-

*Explication of many Terms that are
used in Chymistry.*

TO *Alcoholize*, or reduce into *Alcohol*, signifie to Subtilize, as when a Mixt is beaten into an impalpable powder. This word is also used to express a very pure Spirit; thus the Spirit of Wine well rectified is called the *Alcohol* of Wine.

Amalgamate is to mix *Mercury* with some melted Metal; this Operation serves to render the Metal fit to be extended on some Works, as Gold or else to reduce it into a very subtile powder which is done by putting the *Amalgame* into a Crucible over the Fire: for the *Mercury* subliming into the Air leaves the Metal in an impalpable powder; neither Iron nor Copper can by any means be *Amalgamated*.

Cement is a manner of purifying Gold. 'Tis done by stratification with a hard paste made of one part of *Sal Armoniack*, two of common Salt, and four of Potters Earth, or Bricks powdered, the whole having been moistned with a sufficient quantity of Urine: this Composition is called *Royal Cement*.

Circulation is a motion given to liquors contained in a double vessel, excited by fire, and causing the vapours to ascend and descend to and fro. This Operation tends either to subtilize the liquors, or to open some hard body that is mixed with them.

Coagulate, is to give a consistence to liquids, by evaporating some part of them over the fire, or else by mixing liquors together that are of a different nature.

Cobobate

Cobobate signifies to repeat the Distillation of the same liquor, having poured it again upon the matter that remains in the Vessel. This Operation is used to open Bodies, or to Volatilize the Spirits.

Congele, is to let some matter that is melted fix, or grow into a consistence, as when we let a metal cool, after it has been melted in a Crucible; or else it is when Wax, Fat, Butter, or the like, are taken from the fire and set to cool.

Detonation is a noise that is made when the Volatile parts of any mixture do rush forth with impetuosity; it is also called *Fulmination*.

Digestion is, when some Body is put to steep or infuse in a convenient *menstruum*, over a very gentle heat.

Dissolve, is to turn some hard matter out of a hard into a liquid form, by means of a certain liquor.

To Distil *per ascensum*, is, when fire is put under the Vessel that contains the matter which is to be heated.

To Distil *per descensum*, is, when fire is placed over the matter that is to be heated; for then the moist parts being rarified, and the vapour which rises from them not being able to arise away upwards, as it would do if not hindered, it precipitates and distils at the bottom of the vessel.

Edulcorate, is to sweeten some matter, that is impregnated with Salts, by means of common water.

Effervescency, is the Ebullition of a liquor without the separation of its parts; as when New Milk, or any other liquor's set a boiling on the fire; for after the Ebullition is over, it

E

conti-

continues of the same nature as before.

Extract, is to separate the purer part from the grosser

Fermentation, is an Ebullition raised by the Spirits that endeavour to get out of a Body; for meeting with gross earthy parts that oppose their passage, they swell and rarify the liquor until they find their way out; Now in this separation of parts, the Spirits do divide, subtilize and separate the principles so, as to make the matter be of another nature than it was before.

Though there be some difference between *Effervescency* and *Fermentation*, as has been shewed, yet generally these two sorts of Ebullitions are confounded, and no body scruples to use the one for the other.

Filtrate, is to purifie a Liquor by passing it through a Coffin of brown paper.

Fumigate, is to make one Body receive the Fume of another.

Granulate, is to pour a melted Metal drop by drop into cold water, that it may congeal into grains.

Levigate, is to reduce a hard Body into an impalpable powder upon a Marble.

A *Menstruum* signifies in Chymistry a *Dissolvent*, which is so called, because that Alchymists thought the perfect dissolution of a Mixt Body was completed in one of their Philosophical Months, which consists of Forty Days.

Mortife, is to change the outward form of a Mixt, as is done in *Mercury*. Also Spirits are said to be *Mortified*, when they are mixed with others that hinder or destroy their strength.

Precipitate

Precipitate, is to separate a matter that is dissolved, so as to make it fall or settle at the bottom.

Projection, is when any matter to be Calcined is put into a Crucible, Spoonful after Spoonful.

Rectify, is to Distil Spirits, for the separation of what Heterogeneous parts might have been drawn along with them.

Reverberate, is to cause the flame of the Wood or Coals that's lighted in the Furnace, to beat back upon the Vessel, by means of a Dome placed over it.

Revive, is to restore a Mixt to its former condition that lies disguised by Salts or Sulphurs. Thus Cinnabar, and the other preparations of *Mercury* are *Revived* into Quick-silver.

Stratify, is to lay different matters bed upon bed. This operation is performed when we would Calcine a Mineral or Metal with a Salt, or some other matter.

Sublime, is to raise by Fire any Volatile matter to the top of the Cucurbit, or into its Head.

THE
FIRST PART.

Of Minerals.

WHatsoever is found *Petrified* in the Earth or upon the Earth is called *Mineral*.

Petrification is made by a *Coagulation* of acid or salt waters, that are found in the pores of the Earth. Its formation and growth.

This *Petrification* differs according to the divers dispositions, or different nature of the Earth, and according to the time that Nature uses in its perfection.

The growth of *Minerals* proceeds from an accumulation, or from several veins of congeled Waters, that do as it were glue together, and these veins are the cause that all the adjacent parts have their *Sinus*, and meetings a travers one another, and not running directly downwards.

These *Sinus*, like so many joynts, are of great help to Labourers to cut in the Quarries; for by those cavities the stones are in great measure separated before hand, whereas 'twould be extream hard working them out, if nature had not so concurred.

The growth of *Minerals* is very different from that of *Vegetables* and *Animals*; for whereas the

former does happen through an agglutination of congeled waters, as I have said; the latter is performed by means of *juices* that insinuate and spread in the vessels and fibres, that *Animals* and *Plants* do consist of.

What *Metal* is.

Metal is better digested, better concocted and more compacted, than *Minerals* properly so called. In the production of *Metals* it is probable, that Fermentation effects what Fire commonly does, and separates the gross and terrestriall parts, even as Fire in a Coppel evaporates the Impurities from *Gold* and *Silver*.

The manner of its production.

To produce *Metals* there must be some certain degree of Fermentation, which cannot be had every where, therefore we see some Mountains contain *Metals*, and others yield none, tho' it would seem to us that they are capable enough to produce them.

Seeing *Metal* is the effect of Fermentation, the Sun, or some Subterraneous Fires, must necessarily co-operate to their Production; and so we may ascribe the Generation of *Metals* to that heat, which acts upon substances that are found in suitable Matrixes.

Mines are commonly found in high Mountains, because the heat does centre and unite better there than in low grounds; and consequently there is there a stronger Fermentation for the production of *Metals*.

The hardest, the weightiest, and most compact *Metals* are generated, when by fermentation, there has been an entire separation of the gross parts; for they are only a Coagulation of very subtle particles, and a strict union of these with very small pores.

Metals

Metals lie in *Mines*, very often, like great *Metals are often found in the form of Trees,*
Trees, which spread their branches towards all
 sides; whence it is, that many have thought they
 were nourished, as *Plants* and *Animals*, by juices
 which run and circulate in the veins or Vessels
 supposed to be within them: but if the thing be
 examined narrowly, it may easily be conceived,
 that these branches of *Metals*, (which are called
Veins by those who work in *Mines*) happened
 only by the running of the Metallick matter,
 through several small Canals, before it was coagu-
 lated; which may have been occasioned by the
 Fermentation, that swells the matter, and forces
 it to open the surrounding Earth, in divers places.
 This fermentation also raises very often, (even to
 the top of the Mountain, where there is any
 Metal) strings of some *Marcellite*, or Metallick
 earth, which is taken as a great sign of *Metals* by
 those who search after them.

Because it would be a very laborious and unplea- *Signs of Metals,*
 sant work to dig for *Metals* without some reason-
 able assurance of finding them; therefore some
 have studied to know the several signs and marks,
 by which it may be concluded, that such and such
 places do afford *Mines*.

There are indeed sometimes *Mines*, whose
Veins appear in the very surface of the Earth, so
 so that none can doubt of finding them:
 But if none others were sought after, we should
 not have such abundance of *Metals*. Some there-
 fore of the following marks may serve for disco-
 vering *Mines*.

First it is to be considered, whether the *Ridges*
 and *Tops* of Mountains, their *Chinks*, *Cavities*,
 or *Pits* dig'd in them, do yield any *Marcellites* or

pieces of Metal; for that is a sign there is a Mine somewhere about. And to find out the place, you must follow the string or tract of these Marcassites.

Another sign of a Neighbouring Mine is, when there is found, in the sand of any Rivulet, or spring, small pieces of Marcassite; for these have been carried off by the Waters, which commonly come out of Mountains, and so by tracing the Rivulet or water to its head, you may come at last to the Mine it self.

A third mark of a Mine is, when abundance of hot waters, or waters which have a Mineral taste, flow from a Mountain or any other place: For the places where Metals are generated, are always surrounded with these Waters, which is the occasion of no small trouble and difficulty to those who dig in Mines.

A fourth sign of a Mountains having a Mine in it is, when it is bare and barren, without Trees, and having very few Plants upon it, or when those, which grow there, are pale, and without any fresh colour, for the Mineral vapours, which arise through the pores of this Mountain, do burn the Roots of these Plants. Indeed sometimes Metals are found in very green and fertile Mountains where there be many Trees and other Plants; for the Metallick vapours do either arise there in a less quantity, or are of a different nature, and so do not hinder the growth of Plants in these Mountains: or perhaps the Mines lie at the bottom of them, or may be covered with some hard stone, which intercepts the exhalation of the Vapours from the Plants. However, these green and fertile Mountains do not promise Metals so much

much as those which are dry and barren.

Finally, some very skilful in Mines pretend to know, whether there be any in a Mountain, by adverting to the reflection of the Sun beams.

There being so much water in Mines, which necessarily must be drawn off, therefore they commonly rather begin at the foot of the Mountain than at the top, because the waters may this way be more easily drained.

*Some things
to be observ-
ed by those
who dig
Mines.*

Then they dig a Vault near to the foot of the Mountain, which ought to be continued in a straight line the nearest way to the body of the Mine. But many do often amuse themselves with the small veins of the Metal which they meet with, and upon that account leave the right way, and so both lose their time, and spoil their work, besides that they expose themselves to great danger; for they shake the soft stones, which by this means fall down in great quantity, filling up what they have digg'd, and sometimes crushing the very Work-men. To shun this Accident, they use to prop the Roofs of their Vaults or Rooms which they dig, with great rafters of Wood, to prevent the falling of the loose earth and stones, and then they work by proper Instruments for loosning the Metal it self.

Metals do differ from other *Minerals* in being malleable, which the others are not.

They are counted seven, *Gold, Silver, Iron, Tin, Copper, Lead, and Quicksilver*; this last is not malleable of it self, but is so mingled with the others; and because this is thought to be the *Seed* of *Metals*, it is numbered with the rest.

*The Seven
sorts of
Metals.*

Astrologers have conceited that there was so great an affinity and correspondence between the seven

*The preten-
ded influ-
ence of the
Planets up-
on Metals.*

seven *Metals* before named, and the seven *Planets*, that nothing hapned to the one, but the others shared in it; they made this correspondence to happen through an infinite number of little bodies that pass to and from each of them; and they suppose the corpuscles to be so figured that they can easily pass through the pores of the *Planet* and *Metal* they represent, but cannot enter into other bodies, because their pores are not figured properly to receive them; or else if they do chance to get admittance into other bodies, they can't fix and stay there to contribute any nourishment; for they do imagine that the *Metal* is nourished and perfected by the Influence that comes from its *Planet*, and so the *Planet* again the same from the *Metal*.

For these reasons they have given these seven *Metals* the name of the seven *Planets*, each accordingly as they are governed: and so have called *Gold* the Sun, *Silver* the Moon, *Iron* Mars, *Quick-silver* Mercury, *Tinn* Jupiter, *Copper* Venus, and *Lead* Saturn.

They have likewise fancied that each of these *Planets* has his day apart to distribute liberally his Influence on our Hemisphere; and so they tell us that if we work upon *Silver* on *Monday*, *Iron* on *Tuesday*, and so of the rest, we shall attain our end much better than on other days.

Again they have taught us that the seven *Planets* do every one govern some particular principal part of our bodies; and because the *Metals* do represent the *Planets*, they must needs be mighty *specifick* in curing the distempers of those parts, and keeping them in good plight. Thus they have assigned the *Heart* to *Gold*, the *Head* to *Silver*,
the

the *Liver* to *Iron*, the *Lungs* to *Tinn*, the *Reins*, to *Copper*, and the *Spleen* to *Lead*.

Thus you see in short what some of the most sober *Astrologers* do fancy concerning *Metals*, and they draw consequences from hence, which 'twould be too long here to relate. I have told you what the soberest among them say; for nothing can be so absurd as what some of them would have us believe.

'Tis no hard matter to disprove these conceits, and shew how groundless they are; for no body ever yet got near enough to the *Planets*, to satisfy himself whether they are really of the same nature with *Metals*, or whether any *Effluvioms* of bodies do fall from them to us.

Nevertheless, if we could be satisfied that Experience did confirm what these persons have offered to maintain, we might then have some reason to think there were some likelihood in their doctrine, although their principles were found to be altogether false; but in truth there's nothing to confirm their Opinion, and we find it every day plain enough, that the Faculties and Virtues are utterly false, which they do attribute to the *Planets* and *Metals*; the *Metals* indeed are of good use in *Physick*, and excellent *Remedies* may be drawn from them; but their effects may better be explicated by Causes nearer at hand than the *Stars*.

CHAP.

C H A P. I.

Of Gold.

GOLD is most esteemed among the Seven Metals, because it is more perfect, more weighty, and is thought to receive the influence of the most glorious Body among the Stars, which is the *Sun*. It is also called the King of *Metals*, for the same reason; it is a matter the most compact of any, malleable, unequal in its parts; insomuch that Pores of different figures are observed in it, when it is viewed with a good Microscope.

Where
Gold is
found.

Gold is found in *Mines* in several places, both in *Europe*, and other parts of the *World*; it is usually attended with *Water* and very hard *stones*, such as are extreme hard to dig; there are likewise several *stones* that contain particles of *Gold*, such as are called *Golden Marcassites*, the *Lapis Lazuli*, and *Lapis Armenus*.

Grains of *Gold* are also found in the *Sand* of the *Rivers* of many *Countries*, which have been carried off by the *Waters* as they passed through the *Mines*.

Leaf-Gold.

Gold will spread under the hammer more than any other *Metal*; it is beaten into leaves exceeding fine, for the use of *Gilders*, and to be used occasionally in *Physick*: They will easily mix in composition, and with powders.

Alchymists
pretend to
make Gold.

Covetousness that has always prevailed on the minds of mankind has not left the *Chymists* without

out continual hopes of making *Gold* by their Art, they have conceited that the production of *Gold* was the End that Nature always aims at in all her Mines, and that she's hinder'd in her design, as oft as she produces other Metals which are called imperfect.

And upon this fancy they have spared no time, nor pains, nor cost, in exalting and perfecting these other Metals, and turning them into *Gold*; this is that which they call the *Grand Operation* of all, or the search after the *Philosopher's stone*.

Some of them to compass their end do make a mixture of these Metals with such other matters as serve to purifie them from their grosser parts, and work their Preparations with great Fires, others do put them a digesting in Spirituous Liquors, in imitation of Nature that always uses a gentle heat in her Operations, and so do reduce them into a state of corruption, to draw thereby their *Mercury*, which they think to have the aptest disposition to make *Gold*. Others again do search after the seed of *Gold*, in *Gold* it self, and these make no doubt to find it there, as the seed of a *Vegetable* is more likely to be found in the *Vegetable* it self than elsewhere; in order to this they open the body of *Gold* by proper Dissolvents, then set it a digesting either by a Lamp-fire, or the heat of the Sun, or that of Dung, or some other degree of Fire, to be kept all along at an equal height, and such as is nearest to a natural heat, and this to draw out the *Mercury* of *Gold*; for they are perswaded that if they could once obtain this same *Mercury*, sowing it in the Earth, it would bring forth *Gold*, as certainly as a seed does a *Plant*.

Another

*The Means
used to find
out the Phi-
losopher's
stone.*

*The Grand
of the
Alchymists*

*How well
it should
be managed*

Another sort of these men do take wonderful pains to find out the *seed* of *Gold* in Minerals, as in *Antimony* for example, thinking there's a *Sulphur* and *Mercury* in it as like to those in *Gold* as can be. Others hope to find it out in *Vegetables*, and things that come from them, as in *Honey*, *Manna*, *Sugar*, *Wine*, *Rosa solis*, *Rosemary*, *Spleenwort*. And others pursue after it in *Animals*, and in their *Gums*, *Bloud*, *Urine*. But the most curious and delicate of all, who think all the rest but fools in comparison with them, do hunt after the *seed* of *Gold* in the *Sun*, and in the *Dew*; for the wisdom of *Astrologers* has found out that the *Sun* is a Body all of *Gold* melted in the Center of the World, and Coppel'd by the fire of the Stars that environ it about; nay, They dare affirm that this same *Gold* when it was a purifying did sparkle as *Gold* does in the Coppel.

I should never make an end of this subject, if I should speak of the labours, and pains, watchings, vexations and frettings, and especially the cost these unfortunate men do plunge themselves into, in following their several fancies; they are so extremely prepossessed with the conceit of becoming Rich all of a sudden, that they are altogether incapable of any sober admonition, and they shut their ears to any thing that can be said to disabuse them; so that all other Philosophers, that are not besotted with their fantastical opinions, are by them thought and called Prophane, reserving to themselves the name of the only True Philosophers, or Philosophers paramount.

The wretchedness of some Alchymists.

But the saddest consideration of all is, to see a great many of them, who have spent all the flower of their years, in this desperate concern, in which never-

nevertheless they pertinaciously run on, and consume all they have, at last instead of recompence for their miserable fatigues, reduced to the lowest degree of poverty. *Penotus* will serve us for an instance of this nature, among thousands of others, he died a hundred years old wanting but two, in the Hospital of *Iverdon* in *Switzerland*, and he used to say before he died, having spent his whole life in vainly searching after the Philosopher's stone, *That if he had a mortal Enemy he did not dare to encounter openly, he would advise him above all things to give himself up to the study and practice of Alchymy.*

This man did indeed at last perceive his error and folly, and did acknowledge that he had spent his time most unfortunately and idly; but there are few men who prove so ingenuous as to do so; for they think that their honour is concerned in maintaining whatever error they have once openly defended, and they are quite ashamed to have it believed, that they had laboured in vain so long, and spent their substance in an enterprize that had not good probability of success.

Many of them to avoid such reproaches, and to make the world believe that they have found out some realities, and especially to engage some particular person, they have designs upon, to joyn with them in the pursuit of their projects, have contrived a great many cheating *Legerdemain* tricks, some with the pretended Powder of Projection, others with their *Aurum Potabile*, some by fixing *Mercury* with *Copper*, or *Verdegreefe*; lastly, others with *Cinnabar*, which they turn into *Silver*.

*The Fraud
of some
Alchymists*

They

The Powder of Projection.

They say for themselves that their *Powder of Projection* is the *Seed of Gold* it self, which *seed* has the faculty of multiplying or encreasing the *Gold*, when some small quantity of it is used. And to give a proof of their skill, they put some *melted Gold* over the fire, then they cast a little of their *Powder* into it, they stir about the matter with a rod of *iron*, or some other *metal*, then they cast their *Gold* into an *iron mold*, and it proves to have received a considerable augmentation. At first this Experiment surprizes strangely the spectators, and they are ready to cry out, a Miracle, a Miracle. Then some are greedy to buy this *Powder of Projection*, but the Artist will not part with it, unless he is paid dearly for it. The purchaser thinks he has now got the Bird sure in the nest, he runs in hast home to make multiplication of his *Gold*, he melts it, slings in the *Powder*, stirs the matter about; lastly, he observes the same circumstances he had seen observed before, but at last finds that his *Gold* has made no increase of its weight. Then he thinks he failed in some thing that was to have been done, and so begins the Operation again, once, or twice, but all in vain, he poor man can make no Augmentation, and finds too late that he has been wretchedly imposed upon. Now the mystery of this egregious knavery was thus:

He that stirs the matter, is privately provided with several small pieces of *Gold*, to convey dextrously into the Crucible, or Coppel, at different times, so cunningly that none of the Assistants does at all perceive it; but when he finds that he is too narrowly observed, and foresees that it will be too hard for him to slip in any more *Gold* to that which

which is melted, without being discovered, he then takes a rod of *iron* or *copper*, in the end of which he has inlaid *Gold* so as it may not be discovered, and then stirs about the melted *Gold* with this artificial rod. The *copper* or *iron* melts, and with it the other *Gold* mixes with the rest, and so makes an Augmentation. Now if any body demands what is become of the end of the rod, he answers as plainly enough appears, that it is separated into dross, for *copper* cannot mix with the body of *Gold*. And if we should examine further into the *Powder of Projection*, we should find that it is only *Quick-silver* in *Powder*, or some such matter, that consumes away by the heat of the fire, or else turns into dross.

Their *Aurum Potabile* which they crack with so loud, and which they sell at so dear a price, is commonly nothing else but a tincture of some *Vegetable* or *Mineral*, whose colour comes near to that of *Gold*, and because this *Tincture* is prepared with some spirituous *Menstruum*, it sometimes causes a breathing sweat. Now this *diaphoretick* effect they never fail to attribute unto *Gold*, which yet generally is no occasion of it. This same cheat of theirs is none of the least that they use to get by, for in point of Medicines, abundance of people prove extreme credulous, and especially when an *Universal Medicine* is talk'd of, such as they pretend their *Aurum Potabile* to be. Now I shall shew in the sequel, that the business of *Aurum Potabile* is in reality a mere *Chimera*.

They prepare their *Mercury* by fixing its body with *Verdegrees*, and thus they prepare a matter that comes very near to the colour of *Gold*; for the *Verdegrees*, which is a kind of *Copper*, does

*Aurum
potabile.*

*Fixation of
Mercury.*

F

give

give the *Mercury* a yellow colour, and for fear it should not be coloured high enough to their purpose, they colour it with *Turmeric*, *Cadmia*, or *Lapis Calaminaris*, *Oker*, or some such thing of the like quality: and now they will needs persuade the world that they have performed the feat even of making *Gold*; but if a man will never so little examine this pretended *Gold* by the *Coppel*, the whole flies away in fumes, as *Quicksilver* does commonly use to do. Now if after such trial a Man tells them, that their *Gold* is all gone into the air, they answer for themselves, that indeed this *Gold* had not received its last *Fixation*, but that the main business of it being thus atchieved, they make no doubt by working a little longer upon it they shall soon find out the way of fixing it wholly, and bringing it to its last perfection.

But again, If they could fix their matter so as to make it resist and undergo the *Coppel* (which is a thing in a manner impossible) still they would not be able to maintain their Assertion, That they had made *Gold*; for there are several other trials that their matter must be able to pass, such as the dissolution by *Aqua Regalis*, the *Depart*, the being *malleable*, the *weight* of its substance, without all which qualifications it can never be properly called *Gold*.

Moreover they have a way of turning *Cinnaber* into *Silver*, and this contrivance is full of curiosity. And thus they use to do it:

Of turning
Cinnaber
into Silver.

They stratifie *Cinnaber* grossly bruised in a *Crucible*, with *Silver* in grains: they set the *Crucible* in a great fire, and after some time for its *Calcination* they take it off, and pour the matter into a basin, and then they shew the *Cinnaber*, pretending

ing it to be turn'd into true *Silver*, although the foresaid grains do remain in the form they had before. Hence they conclude the possibility of Transmutation of Metals, because the *Mercury* of the *Cinnaber* is turned into *Silver*, whereas the *Silver* did remain as it was before.

This Experiment amazes people much, and it is hard to see those same pieces of *Cinnaber*, which were put into the Crucible before them, chang'd from *Mercury* into pure *Silver*, without inclining to believe an Augmentation of this last metal; nay, many conclude that there remains no longer doubt of it. And men continue possess with this error, until some body has the curiosity of examining the granulated *Silver*, and then the abuse begins to be discovered, for it is found to be exceeding light, and if it be prest between the hands, it crushes in pieces as easily as *membranes*. The Augmentation comes to be no longer believ'd, when the grained pellicles are weighed with the pieces of *Cinnaber*, for the whole weighs no more than the *Silver* in grain did before it was put into the Crucible. Lastly, it must of necessity happen (which appears very strange) that the *Mercury* does first Amalgamate with the *Silver*, that it conveys this *Silver* into the pieces of *Cinnaber*, and then being evaporated over the fire, it leaves the *Silver* all alone.

I could here relate divers other subtle inventions of *Alchymists*, by which they too often impose on such as have plenty of money, to make them become fellow-partners with them in their Operations; but I should prove too tedious on this subject: I have only toucht upon them by the by, in order to disabuse such men as are prepossess

The improbability of making Gold.

with an opinion of the Transmutation of Metals.

Although I cannot absolutely deny, but that some certain Artist, by a particular method, might have got the way of making *Gold* heretofore, nor that some body may be as lucky in time to come; yet there is more appearance of impossibility than possibility in the case, because of the small knowledge that any of us have of the Natural Composition of this Mixt; for seeing that *Gold* as well as *Silver* is drawn from Mines environ'd with Waters, it is very probable that these Waters do bring along with them some saline Principles that congele and incorporate in Earths of a particular composition, and whose Pores are disposed in such a manner as 'tis impossible for Art to imitate. Nevertheless in order to make *Gold*, a perfect knowledge of the Salts that the Waters of the Mines do convey, is very requisite as well as the disposition of the Matrixes or Earths in which they do congele. Wherefore a Man must be soundly prejudiced, before he can believe that by the help of artificial Fires, he can concoct Metals so as to turn them into *Gold*.

As for the *Mercury* which men pretend to draw out of Minerals and Metals, and which they believe to be the seminal principle of *Gold*, it is a thing merely imaginary; for first of all, it is a great question and may be doubted, whether there be any *Mercury* in those metallick matters wherein it is sought after; but if we should suppose it in them, what reason shall we have to make it be the seed of *Gold*? We can no ways find that *Mercury* is able to produce *Gold*, nay further, as I said before, the growth of Metals and Minerals is quite of another nature than that of Vegetables.

Now

Now, say they, the *seed of Gold* is communicated unto all bodies, and that it does abound in the Universal Spirit. And because *Manna, Dew, Honey*, are impregnated with this Spirit, that *Gold* may by Art be drawn out of those substances.

We grant unto them, that the Universal Spirit does contain an *acid* which serves towards the production of *Gold*, because the acid Waters or salts which do enter into the composition of this metal, do proceed from the Universal Spirit; but if you go to call this acid a seed, it will prove to be the seed of all other mixt bodies as well as that of *Gold*, and there's no more reason for thinking that the Universal Spirit does abound in the seed of *Gold*, than in the seed of the grossest Metal, or the most unuseful Plant, or the most contemptible of Animals; so that we may conclude, that to spend ones time in making of *Gold*, seems properly to lose it by working in the dark, and I find that *Alchymy* has been very well defined to be, *Ars sine arte, cujus principium mentiri, medium laborare, & finis mendicare*, an Art without any Art, whose beginning is Lying, whose middle is nothing but Labour, and whose end is Beggery.

Gold is a good Remedy for those who have taken too much *Mercury*; for these two Metals do easily unite together, and by this union or Amalgamation the *Mercury* fixes, and its motion is interrupted. This is plainly enough perceived in such as have received the Frictions with *Mercury*; for if they do but hold a piece of *Gold* in their mouth a little, it will grow white by the vapour of the *Quicksilver*.

Gold taken inwardly is thought to be a most potent Cordial, because *Astrologers* tell us it re-

Definition
of Alchymy

Gold good
for those
who have
taken Mer-
cury,

*Aurum
Potabile.*

ceives its influence from the Sun, which is as it were the heart of the world; and by the communication of those influences to the heart, it serves to fortify and cleanse it from all impurities; upon which ground a great many Operations have been invented in order to open this Metal, and separate its Sulphur from its salt. Moreover this Operation by way of bravery is called *Aurum Potabile*, because this Salt or this Sulphur dissolving in a Liquor, can be taken by way of *Potion*: And because this *Aurum Potabile* can be thought to be distributed into all parts of the body, they fancy it can drive out every thing that interrupts the Functions of Nature, that it can free him that takes it from all fear of any Diseases for a long time, and can prolong life.

But this opinion is built upon a weak foundation, and Experience does not confirm any of these glorious effects; for what assurance can we have, or what Evidence is there, that the Sun is such a great friend of *Gold*, or that it bestows more influence on it, than on other mixt bodies; it is a thing that can never be prov'd, and we see that the Sun casts its light and heat in general upon all bodies, without making any difference. Who can understand, that the Pores of *Gold* are so disposed, as to have a greater facility of retaining the Sun's Influences, than other Metals or things? This will be full as hard to prove as the other.

But though we should grant *Astrologers* this supposition concerning the Sun's influence on *Gold*, the consequence they draw from it, that therefore it fortifies the Heart, would be ne'er a whit the truer; for all that we are able to apprehend in *Gold*, is, that it is a most compact and weighty

weighty body, the union of whose Principles is extraordinary close; which is proved from hence, that no Art can instruct us to dissolve it radically, so as to separate its Salt, and its Sulphur. This *Gold* being beaten into the thinnest Leaves that can be imagined, and taken inwardly, receives not the least change in our bodies, and is voided the very same it was before, excepting when *Quick-silver* has been taken beforehand, for it unites with that, as I have said.

Wherefore we must conclude, that if *Gold* has received more Influence from the Sun than other Metals, yet it is never the fitter to dissolve in our bodies, nor to produce those rare effects that are talkt of.

I know that stories are told to prove, that *Gold* does communicate virtue to the bodies of those who have taken it, and that it loses in the body some of its quantity; and among other stories 'tis said, that several persons who had fed upon *Capons*, nourished with a paste made of a mixture of *Vipers* flesh and *Gold* together, have been cured that way of several Diseases; but there's a great deal more reason to attribute this effect rather to the *Vipers* than *Gold*; for we know by experience that *Vipers* taken inwardly without any thing else, do use to produce divers sensible effects, whereas we observe none at all in *Gold*, when 'tis given alone.

As for the diminution they imagine of *Gold* in bodies, they prove it by their gathering together all the Excrements of those *Capons*, and Calcining them, for they could obtain again but the fourth part of the *Gold* that was used in the paste the *Capons* had fed upon. But this proof is as weak as the former; for the Excrements of the *Capons* be-

Gold may
be volatili-
z'd.

ing full of a volatile Salt, that Salt may have Volatiliz'd and carried away the greatest part of the Gold during the Calcination, after the same manner as we see several Volatile liquors to sublime Gold. I know well enough by my own Experience, that there are such Volatiles as are able to sublime Gold; for having one day mixed three ounces of Gold with about three pounds of matter consisting of divers Volatile ingredients, I put the mixture about a month afterwards into the Coppel, and the Gold appeared very resplendent in the middle of the mixture; but blowing, as we use to do, in its purification, I was astonish'd to see it exalt away by little and little into the Air, until there was not a grain of it left.

Thus no body can be assur'd that Gold did nourish those Capons; but besides, though some of it should be dissolv'd in the body, as it does in *Aqua Regalis*, which is very hard to conceive; though some of it should exalt, nay though some should plainly glitter in the Chyle, here's no proof nevertheless that it produces such wonderful effects.

Now although I have assert'd that Gold taken alone does not receive any change as for health, yet I value very much several preparations of Gold made with *Spirits*; for 'tis these *Spirits* that give certain determinations to Gold according to their nature, and make it operate as it does. When I speak of *Aurum Fulminans*, I shall give an instance of what I now say.

Purifi-

Purification of Gold.

TO Purifie Gold is to separate from it the other Metals which are mixed with it.

Put as much Gold as you please into a Crucible, make it red hot, and when it begins to melt, cast into it four times as much Antimony in powder, the Gold will presently melt; continue a strong Fire, until you perceive the Matter to sparkle.

Then take your Crucible out of the Fire and knock it, that the *Regule* may fall to the bottom. Break it when it is cold, and separate the *Regule* from the dross that remains a top of it. If you have a mind to save your Crucible, pour out the matter that lies in Fusion into an Iron Mortar made like a Founder's Mould, which you shall have heated a little and greased before-hand, then strike about the Mortar with pincers, till the matter settles in a Mass.

Let this Mass cool a little, then flinging it out, separate the *Golden Regule*, from the dross. Weigh this *Regule*, melt it again in a Crucible over a strong Fire, and when it shall come to melt, throw into it by little and little three times as much *Salt-peter*: continue a good strong Fire, that the matter may remain in Fusion, and when the Fumes are all gone, and it appears clear and clean, cast it into your Iron Mortar warm'd and greas'd, as I said but now, or else leave it in the Crucible that you shall beat while it is cooling, for the separation of the *Regule* from the dross that remains a top, and your *Golden Regule* will prove perfectly pure.

Regule of Gold.

Remarks.

Remarks.

To purifie
Gold by the
Coppel. The ordinary way of *purifying Gold* is the *Coppel*, in which the same method is used that I shall speak of in the *Purification* of Silver. But the *Coppel* not being able to separate Silver from Gold, recourse is had to another Operation, that is called the *Depart*.

The Depart. Melt three parts of Silver with one part of Gold, in a Crucible over a good Fire, and when this mixture is in Fusion, cast it into cold water, and it condenses into *Grains*, which being dried, a separation of the Silver from the Gold is made by the means of *Aqua fortis*; for this *Menstruum* dissolves Silver very well, but the Gold remains in powder at the bottom of the Vessel, for the reason that I shall relate in the Chapter of *Aqua Regalis*. The Dissolution of Silver is poured off by Inclination, then the Powder of Gold is washed to be made sweet.

But it often happens that some particles of the Silver do still remain united with the Gold, so that this Purification cannot be said to be altogether perfect.

Cementation. There is another method of *Purifying Gold*, to wit, *Cementation*, which is thus performed.

Stratife in a Crucible thin plates of Gold, with a dry paste, that is called *Cement*, in which the Salts *Gemma* and *Armoniack* do enter; cover the Crucible, and having made a fire round about it, Calcine the matter for ten or twelve hours with a violent heat, that the *Salts* may eat and consume the impurities of the Gold: but nevertheless they often leave it still impregnated with other Metals, and

and sometimes they eat the *Gold* it self, so that a part of it is lost.

The *Purification* of *Gold* by the means of *Antimony* is better than any other; for there is nothing but *Gold* that is able to make resistance against this devourer; it often eats some portion of it, but never leaves it in any other Metal.

You must remember to lay a *Tile* under the *Crucible*, for fear that the air which comes by the *Ash-hole*, should happen to cool the bottom of the *Crucible*.

Gold presently melts as soon as *Antimony* is cast into the *Crucible*, by reason that *Antimony* contains some *Saline Sulphurs*, which do encrease the force of the *Fire*, and do separate the parts of this Metal; it is then that the more porous and volatile part uniting with the *Antimony*, one part evaporates away in *Smoke*, and the other remains fixt in the *Dross*.

The sparkles which towards the end do fly out of the matter do proceed from some Particles of *Antimony*, which finding themselves intangled in the *Gold*, do use violence to get out.

Then take your matter off the *Fire* that it may lose none of its substance, and pour it into an *Iron Mortar* as I said before. After this the *Regule* is melted once more, and *Salt-peter* cast into it to absorb or receive all the *Antimony* that may yet remain, and so by this means you have a *Regule* as well purified as may be, and even that of four and twenty *Caratts*, if there be any such *Gold*.

A *Carat* of *Gold* is properly the weight of one *Scruple* or four and twenty grains, and four and twenty *Caratts* make an ounce.

If

If you take an ounce of *Gold*, and find that it loses not a jot in the *Purifications* that may be made of it, this is called *Gold* of four and twenty *Caratts*; if it be found to have deminished but one *Caratt*, then it is said to be *Gold* of three and twenty *Caratts*; if it loses two *Caratts*, then it is *Gold* of two and twenty *Caratts*, and so of the rest. But it is commonly held that there is no such thing to be found as *Gold* of four and twenty *Caratts*, because there is none but contains some small proportion of *Silver*, or *Copper*, purifie it as much as you will.

Red Gold is the less valuable, because it contains the more *Copper*, which gives it this colour; the *Yellow* is the better, and it ought to remain *Yellow*, even whilst it is in the fire.

A *Caratt* of *Pearls*, *Diamonds*, and other precious stones, is but four grains.

Amalgamation of Gold with Mercury, and its reduction into an impalpable Powder.

TO *Amalgamate Gold* is to mix it with *Quick-silver*.

Take a Drachm of the *Regule* of *Gold*, beat it into very thin little Plates, which you must heat in a Crucible red hot in a large Fire; then pour upon it an ounce of *Quicksilver* revived from *Cinnaber*, as I shall shew hereafter; stir the matter with a little Iron-rod, and when you find it begin to raise a fume, which quickly happens, cast your mixture into an Earthen Pan fill'd with Water, it will coagulate, and become tractable; wash it several times to take away its blackness; thus you have an

an *Amalgame*, from which you must separate the *Mercury* that you find not united, by pressing it a little between your fingers in a linnen cloth. The *Gold* retains about thrice its weight in *Mercury*.

Now to reduce this *Gold* into Powder, you must put this *Amalgame* into a Crucible over a gentle fire, the *Mercury* will evaporate into the Air, and leave the *Gold* at bottom in an *impalpable Powder*.

Powder of
Gold.

Remarks.

Mercury doth easily penetrate *Gold*, and insinuating into its Pores makes a soft matter that is called *Amalgame*; it doth the same with other Metals too, except Iron and Copper, which are too ill digested to receive its impression.

Tho' the vapour of *Quicksilver* be very thin and light, yet it uses to whiten *Gold*. I have often seen the proof of it amongst those who have undergone the cure of the *Flux debouche*; for not only the *Gold*, which they had on them, but what was in their Breeches, near their bed, has been so whitened, that they have apprehended, that some body or other had changed their *LOUIS d'OR'S* into Counters. To bring back *Gold* (thus altered) to its true colour, you must put it some time into the Fire, for evaporating the *Quicksilver*, and then rub it with the *Oil of Tartar per Deliquium*, to clean it from the blackness, which the Fire gives it.

The *Amalgamation* of *Gold* is useful to *Gilders*, for so it is easily extended upon their works.

Aurum

Aurum Fulminans, called, Saffron of Gold.

THIS Operation is a *Gold* impregnated with some Spirits, which cause it to give a loud crack, when it is set over the Fire.

*Dissolution
of Gold.*

Take what quantity you please of *Gold* beaten into thin plates, put it into a Viol, or Matrafs, and pour upon it by little and little three or four times as much *Aqua Regalis* compounded after the manner I shall shew in its proper place. Set the Matrafs upon Sand a little heated, until the *Aqua Regalis* has dissolved as much of the *Gold* as it is able to contain, which you will know by the ceasing of the Ebullitions, pour your solution into a glass by inclination; and if there remains any *Gold* in the Matrafs, dissolve it, as before, with a little *Aqua Regalis*; mix your dissolutions, and pour upon them five or six times as much common Water. Afterwards drop into this mixture by degrees the Volatile Spirit of Sal Armoniack, or the Oil of Tartar made by *Deliquium* or Solution, you'll find the *Gold* precipitate to the bottom of the Glass. Let it alone a good while to settle, that all the *Gold* may fall down, then pouring off the Water by Inclination, wash your powder with warm Water, till it grows insipid, and so dry it in Paper at a gentle Fire, because it is apt to fire, and the Powder would fly away with a terrible noise.

Precipitation.

Weight.

If you use one drachm of *Gold*, you will obtain four scruples of *Aurum Fulminans* well dried.

Its Virtue.

Aurum Fulminans causes sweat, and drives out ill humours by Transpiration. It may be given in the

the Small Pox from two to six grains in a Lozenge, *Dose.*
or Electuary. It stops Vomiting, and is also good
to moderate the activity of *Mercury*.

Remarks.

The Plates of *Gold* are made use of in this Operation, that its dissolution may be more easily performed.

You must pour the *Aqua Regalis* by little and little, to avoid the great effervescency that might be able to drive it out of the Matrafs. The effervescency proceeds from the violent division of the particles of *Gold* by the *Aqua Regalis*; for when it finds no more bodies to act upon, having divided the *Gold* into as many parts as 'tis possible, the ebullition ceases, and though the *Gold* doth all remain in the *Aqua Regalis*, it becomes so imperceptible to us, as it seems the Water hath not changed from what it was before, it appears so very clear and transparent. Indeed the solution has received a Golden colour, and becomes yellow.

The Ebullition.

The dissolution of *Gold* is a suspension of this metal in Phlegm, made by the edges of *Aqua Regalis*. For it is not enough that the *Aqua Regalis* does divide the *Gold* into subtle parts, but it is further requisite that its edges do hold up the *Gold*, as if it were like so many Finns, otherwise it would always fall to the bottom in a powder, though it were never so subtle.

Dissolution.

Now 'tis objected that the particles of *Gold* should fall to the bottom of the liquor, because, being joined to the points of the *Aqua Regalis*, they are become more heavy than they were before; for the union or adhesion of two bodies does

Objection.

does cause a greater weight, than when the two bodies were separated one from the other.

Answer.

I answer, That we ought to conceive the particles of *Gold* being suspended or held up in the Phlegm by the *acid* points, much after the manner as we do conceive very well, that a small piece of metal fixed to a staff or a plank, will swim with the wood in the water; for although the small piece of metal sinks to the bottom when it is alone, yet it swims when it is affixed to the wood; the *acid* edges are bodies exceeding light in comparison with the particles of *Gold*, and they have likewise their superficies, more extended, and consequently do take up more room in the phlegm; this is that which holds them up, and causes them to swim.

The cause of Precipitation.

The Oil of Tartar, or the Spirit of Sal Armoniack is used for the Precipitation of Gold, because both those Liquors do contain an Alkali Salt, which being mixed with *acids* must cause a Fermentation. Now in this Fermentation the parts of *Aqua Regalis* that held up the particles of Gold do grow weak, and having no more force to retain them longer, they must needs precipitate by their own weight.

Difficulty.

Perhaps some may find a difficulty in comprehending how the Volatile Spirit of Sal Armoniack should come to weaken the *Aqua Regalis*, that is it self compounded of Sal Armoniack; but there will be no difficulty at all, when they shall consider that the force of the *Aqua Regalis* doth not so much depend on the volatile part of the Sal Armoniack, as on the Sea-salt, that is in good store in it united with the *Aqua Fortis*; for Sea-salt, or *Sal Gemma* may be substituted very well

Solution.

well in the place of Sal Armoniack, for making *Aqua Regalis*, as I shall observe hereafter, speaking of the composition of this Water. It may be also enquired here, why the Dissolvents do quit the bodies they held before the Dissolution, to betake themselves to some other: for example, why the *Aqua Regalis* leaves the Gold it was impregnated with, to give way to the Alkali Salt. This question is one of the most difficult to resolve well, of any in Natural Philosophy. Difficulty.

Nevertheless, I'll give you my opinion of what can be said most sensibly on this Subject.

I do suppose that when the *Aqua Regalis* hath acted upon the Gold, so as to dissolve it, the points or edges that enabled it to do so, are fixed in the particles of Gold. But seeing that these little bodies are very hard, and consequently hard to penetrate, these points do enter but very superficially, yet far enough to suspend the particles of Gold, and hinder them from precipitating. Wherefore if you would add never so much Gold more, when these points have seized upon as much as they are able to joyn with, they cannot possibly dissolve one grain more; and it is this suspension that renders the particles of Gold imperceptible. But now if you add some body that by its motion and figure is able to engage the *acids* enough to break them, the particles of Gold being left at liberty will precipitate by their own weight. And this is what I conceive the Oil of Tartar, and Volatile Alkali Spirits are able to do. They are impregnated with very active Salts, which finding bodies at rest do presently move them, and by the quickness of their motion do shake them so violently, as to break the points by which they were suspended; How re-moved.

G

suspended;

suspended; these fragments of little points being thus disengaged from the Gold, are still keen enough to act, and they have action enough remaining to pierce and divide violently the parts of Alkali Salts, which are much more soluble in their nature than Gold, and this occasions the Ebullition which presently happens when these Spirits are poured upon the Dissolution.

These edges then being thus broken, two things must follow thereupon. The first is, That the remaining *Aqua Regalis* is rendred incapable of dissolving any more Gold, because it hath no more power left of making a penetration. The second is, That the precipitated Powder of Gold is impregnated with some part of the Dissolvent, by reason that the sharpest part of these edges remains within it.

Experience teaches us both the one and the other: to wit, The force of the *Aqua Regalis* is quite destroyed for dissolving any more Gold, and the precipitated Powder hath drawn along with it some Spirits that are so closely lockt up, that though it be several times waisht in warm Water, they cannot possibly be disengaged from their hold. And this is evident, when it is put upon the Fire; for the great Detonation, or noise that it makes, cannot proceed from any thing else, but the inclosed Spirits which violently divide the most compact body of Gold to get out quickly, when they are forced to it by the action of Fire.

*Fulminati-
on of Gold,
its cause.*

*Fulmina-
ting Pow-
der.*

I can here explicate by the by, after the same manner, the action of a certain Powder, consisting of three parts of Nitre, two parts of Salt of Tartar, and one part of Sulphur. This Powder being heated in a Spoon to the weight of a Drachm,

gives

gives as Thundering a noise as a Cannon it self. Now the fixt Salt of Tartar causes in this Powder what the Gold did in the other; that is to say, it retains the Spirit of Nitre and Sulphur so lockt up, that they cannot be separated without violently breaking their Prison; and this is that which makes such a noise.

Both the *Gold* and this Fulminating Powder exert their greatest force downwards: for if we make use of Copper spoons, they will be pierced through after the Fulmination: but Silver or Iron spoons are not pierced, because they make a greater resistance.

When this Fulminating Powder is heated by a great Fire, it cracks presently, but makes no great noise, because the Ingredients of which it is compounded have not had time to unite themselves closely together. If you would have it to make a strong detonation, or loud noise, it must be only heated over a small Fire; and let it continue for the space of half a quarter of an hour: during which time it melteth, and the particles close together, so that the Salt of Tartar keeps the Volatile shut up until the Fire violently disengages them by a very surprising noise.

If you put the Powder of Fulminating Gold <sup>Fulminating
on without
Fire.</sup> into a Marble Mortar, and beat it a little hard with a common Copper or Brass Pestle, some part of the Powder will fly into the Air with a small noise: And if you continue to beat it, all will fly away like Lightning. I have try'd the same thing in a Mortar of Brass, but it had not the same effect.

The reason I would give of this is, That the beating of the Fulminating Gold in the Marble Mortar, with a Copper Pestle, does heat the matter, and rarifie the Spirits of Salts contained in it, so that they are forced to break their chains with violence, to obtain a free passage. But this does not happen in a brazen Mortar, either because the heat is not there so great, or because the Metals closing together, do absorb or drink up the Salts.

*The virtue
of Aurum
Fulminans.*

Aurum Fulminans taken inwardly causes sweat, because the heat of the Body volatilises it, and drives it through the Pores. Now if the Pores are very open, it will only cause an insensible transpiration: but if they are closed up by the coldness of the weather, so that it must remain some time before it passes; the vaporous humidity which bears it company, dissolves upon the skin into what we call sweat.

Some think the Gold contributes nothing at all to these transpirations, and that the spirit of Nitre alone being forced by the heat of the body to pass through its Pores causes all the action. But I conceive it is more likely that these spirits do carry along with them some parts of the Gold, with which they are so intimately mixed. And by this explication may be better comprehended, how so small a quantity of spirits is able to produce sweat; for suppose there passes through the Pores one grain of Gold, and two grains of spirits, these spirits, being as I may so say, armed with the grosser parts of Gold, will be better able to conquer the resistance that shall oppose their passage, than if they were separate; after the same manner as a good piece of Timber that is driven along

along by the stream of a River will strike with much more violence against the Arch of a Bridge, and endanger it much more, than a single Wave would be able to do, though never so swift.

There are two sorts of insensible Transpirations, one hapening at all times, as well in health as sickness, and the other in a burning Feaver, or else sometimes upon the taking a *Sudorifick*.

*Different
sorts of in-
sensible
Transpira-
tions.*

The first Transpiration is insensible, because the vapour which passes continually through the pores is yet in so small a quantity, that though it does dissolve in a moisture upon the skin, it is not perceived at all.

The other is caused by a great motion of the Spirits which drive the humours through the pores of the body after a rapid manner; and whereas at that time the pores become very open, and the skin is heated more than ordinarily, the vapour passes away through the skin without condensing upon it.

But if once the rapid motion of humours begins to slacken, then the sweat appears, and begins to be felt; and this does happen in *Agues*, for during the great heat of the *Ague*, men do not sweat at all, but only in the declination of the fit; because then the skin somewhat cools, the vapour condenses into a moisture, which we call sweat; wherefore sweat may be said to issue from a middle degree of heat, between the first insensible Transpiration, and the second.

Most men think that there goes out more moisture in the time of the sweat, than by the insensible Transpiration which is made during the height of the hot fit; but they seem to be mistaken very likely, for it may easily be conceived, that there should be a greater dissipation in the vigour

G 3 of

of the fit, than afterwards in the declination, by reason that at that time the heat is greater, and so more able to impel forth *effluvia*.

Distillation in a Retort will confirm what is here maintained. For if you make only a moderate fire under the Retort, the moisture which rises out of the matter will distil drop by drop, because the vapours cooling and condensing in the neck of the Retort do resolve into a liquor; but if you make a great fire in the Furnace, so that the neck of the Retort comes to be heated too much, all the moisture is driven in a meer vapour, and there appears not the least humidity in the neck of the Retort.

I have already said, That *Gold* doth repress the violence of *Mercury*, because it doth *Amalgamate* with it; but *Aurum Fulminans* doth it much better, for being Volatile it is more easily carried through all the body, and falls not to find out the *Mercury*, wheresoever it lies.

We need not fear lest *Aurum Fulminans* taken inwardly, and heated by the stomach, should cause such a *Detonation* there, as it does when set over the fire in a spoon; for so much the more moisture as comes to it, so much the less noise does it make. Now it can't be question'd, but there is liquidity enough in the stomach, besides the liquid vehicle 'tis usually given in. There is no need then of calling in the acids of the stomach, as some do, to unite with the salts of *Aurum Fulminans*, and drive them out of the body of this Metal: for besides that the most clear and disinterested Explications and such as fall most under our sense, ought always to be preferr'd, 'twould be too hard a matter to maintain that; 'tis true if you wet

Aurum

Aurum Fulminans with the spirit of Vitriol, or Salt, or Sulphur, the Fulmination is thereby hindered, but this happens from the acids fixing by their weight the Volatility of those Salts that remain in the pores of the *Gold*.

In the Chapter of *Gold* I could reckon up several other Preparations that have been invented, but because they are out of use, I shall not swell this Book with an account of them.

CHAP. II.

Of Silver.

SILVER hath the second place among Metals, it is a very compact body, more smooth and polished by Nature than *Gold*, and its pores are more even upon the surface. It is malleable like *Gold*, but will not so easily yield or extend under the Hammer, and is not so weighty.

It is called the *Moon*, as well from its Colour, ^{Moon,} as from the Influences the Ancients thought it received from the *Moon*. Many properties are attributed to it against Diseases of the Head, but these pretended Virtues seem to have no other foundation than the imagination of Astrologers and Chymists, who were of the opinion that the *Moon* had a great deal of correspondence with the *Head*. There is no need I should enlarge in confutation of this opinion, experience every day teaches us that it is a pure abuse.

Silver is not often found alone in Mines, for commonly it is either mixed with *Copper*, with *Lead*, or with *Gold*: that which is mixed with *Lead* lies in a kind of black stone: but what is found with *Copper* is generally in a very hard white stone much like unto *Cryстал*. Yet there are pieces of pure *Silver* sometimes got in Mines, which is so hard, that it cannot be melted, unless it be mixed with a good quantity of other *Silver*; which is the reason that it cannot be known of what *Denier* it is.

Silver may be also given like *Gold* for Diseases caused by too much *Mercury*; for they suffer an *Amalgamation* very well together.

Whereas there is no certainty, that ever there was drawn out of *Gold* or *Silver* any thing that deserves to be called either a *Salt*, or *Sulphur*, or *Mercury*, I have not at all followed the method of Authors, who will needs explicate the differences which are to be found in these Metals, by more or less, of one or two of these Principles. I am contented to relate only that which may be known in *Gold* or *Silver*, and I think it better to say little of a thing, and be able to prove my assertion, than form grand Ideas of things that are very doubtful.

Purification of Silver.

TO Purify *Silver* is to separate from it the other metals with which it is mixed. This operation is done by the *Coppel* after the manner following:

Take

Take a *Coppel* made of the ashes of Bones or Horns, cover it and heat it gently in the coals, until it grows red-hot, then cast it into four or five times as much *Lead* as you intend to purifie *Silver*: let the *Lead* melt, and fill the sides of the *Coppel*, which is soon done; then cast your *Silver* into the middle, and it will presently melt. Lay wood round about the *Coppel*, and blow it that the flame may reverberate on the matter, the impurities will mix with the *Lead*, and the *Silver* remain pure and clean in the middle of the *Coppel*, while the *Lead* being fill'd with the drossie parts of *Silver* lies on the sides like a scumm, that you may gather up with a spoon, and this is that which is called *Litharge*, which according to the degree of Calcination it hath endured, becomes of divers Colours, and sometimes is called *Litharge* of Gold, and sometimes *Litharge* of *Silver*. If you leave *Litharge* it in the *Coppel*, it will pass through its Pores.

For you must observe that the *Coppel* being expressly made of ashes deprived of *Salt*, is very Porous; you must continue the Fire till there rise no more Fumes.

This Preparation cleanses *Silver* from all other Metals, except *Gold*, which resists the power of the *Coppel*. You must therefore have recourse to the *Depart*, or Operation I described, when I spoke of the Purification of *Gold*; for *Aqua fortis* dissolves *Silver*, but not being able to penetrate *Gold*, leaves it in a powder at the bottom.

Pour off then by Inclination the dissolution of *Silver* into an Earthen pan, wherein you shall have laid before-hand a plate of Copper, and ten or twelve times as much common Water. Let this mixture lie still for some hours, and when you find

Agua Secunda.

find the Copper covered all about with the Powder or Precipitate of *Silver*, and the water becomes blue, Filtrate it, and you have that which is called *Agua Secunda*: It is good to make the Euchar fall in Chancres, and to consume proud flesh. Dry the powder of *Silver*, and if you desire to keep it in an *Ingot*, melt it in a Crucible with a little *Salt-peter*.

Different precipitations.

If you steep a plate of Iron some hours in the *Agua Secunda*, the Copper which made it look blue will precipitate according as the Iron dissolves. If you Filtrate this dissolution, and put a piece of the *Lapis Calaminaris* into it, the dissolved Iron will fall to the bottom in powder, and the Stone will dissolve it. If you Filtrate this water, and pour upon the Filtration drop by drop the water of fixt *Nitre*, the *Lapis Calaminaris* will precipitate. Lastly if you Filtrate this water too, and having evaporated a part of it, set the rest a Crystallizing, you'll meet with a *Salt-peter* that burns like the ordinary sort.

Remarks.

Coppel.

The Coppel is an Earthen Vessel that resists the Fire, made like a dish: it is fill'd with a Paste made of ashes that have lost all their Salt, such as those of Bones; which lose all their Salt while they are a burning, because it is so Volatile: a hole is made in the middle to let in the matter that is to be Coppel'd, and so the Vessel is set a drying.

You must put *Lead* into the Coppel, in proportion to the impurities that are in the *Silver*; commonly they put four times as much. That which is here called Impurity is nothing else but some parts

parts of other Metals, that superficially adhered to the *Silver*, when it was taken out of the Mine. These Metals do mix much better with *Lead* than *Silver*, because the *Lead* is full of Sulphureous porous parts which readily engage and receive other Bodies. On the contrary *Silver* hath Pores exceeding close and strait, and can neither be penetrated nor unite with these Matters but only superficially; so that in the Fusion they do separate, and only slide over this Solid body. It is also remarkable that the hardness of *Silver*, and strait contexture of its parts do hinder the Fire from melting it after the same manner as other Metals, that are more porous; and this is the reason it remains unmixed among them.

Silver melts much sooner by being put into melted *Lead*, than if you had endeavour'd to melt it alone in the Crucible, because *Lead* contains many Sulphureous parts that are very serviceable for the Fusion of Metals. The flame is made to Reverberate on the *Silver*, to drive all Heterogeneous substances towards the sides.

That which is called a *Caratt* in *Gold* is a *De-Denier*, or penny weight in *Silver*, and thus an ounce of *Silver* well purified is of four and twenty penny weight, which make 24 times 24 grains. Now this ounce of *Silver* must lose nothing at all upon trial; but if it should lose one penny weight in the Coppel, the *Silver* then is said to be that of 23 penny weight, and if it loses two scruples, or penny weight, it is but of 22 *Deniers*, but they use not to say, *Silver* of 24 *Deniers* or penny weight, as *Gold* of 24 *Carats*; for they double the *Denier* or penny of *Silver*, and say, *Silver* of 12 penny weight for the finest, *Silver* of eleven penny and a half,

a half, *Silver* of eleven penny, and so on, according to its fineness.

There is no *Silver* to be had of 24 *deniers*, or 12 penny fine, no more than *Gold* of 24 *Caratts*, because there is always some mixture with it, use what diligence and application you please in its purification.

*Difference
between
Plate and
Coppel Sil-
ver.*

Plate-silver contains one part of *Copper* to 24 parts of *Silver*, and the *Coppel-silver* contains but a quarter of a part of *Copper* to four and twenty parts of *Silver*.

Remark.

The *Depart*, or parting of Metals, is when a Dissolvent quits the Metal it had dissolved, to betake it self unto another. Thus when *Copper* is put into the Dissolution of *Silver*, the *Aqua fortis* leaves the *Silver*, to fall upon Dissolving the *Copper*.

Some offer to explain these Precipitations by saying, that some of these Metals have pores more fitted to the figure of the edges of *Aqua fortis* than others; and that therefore it quitteth one to dissolve another. But it seems they endue the edges of *Aqua fortis* with Understanding; for how otherwise can they make the edges of this Liquor, which in the dissolution of *Silver*, were entangled with the small particles of this matter, and kept them suspended: I say, how can they suppose them to leave these small particles to go mix themselves with the *Copper*, without supposing also that the *Aqua fortis* is endued with Reason?

I believe, we may clear this difficulty better by saying, that the Phlegm of the dissolution disengageth the small particles of the *Copper* which swim within the liquor: and then these particles meet with the edges of the *Aqua fortis*, charg'd

charg'd with the particles of *Silver*, they stirr and shake them untill they break; from whence cometh the Precipitation of the *Silver*: for the edges which kept it before, being now broken, and the Phlegm no longer capable to support it, it must needs precipitate by its own weight. As to the dissolution of *Copper*, it is made afterwards by the force which remains in the *Aqua fortis*; for tho' the subtle points of this dissolvent be broken, yet it is still sharp enough to penetrate all that is dissolvable in that *Copper*, and to make the *Aqua secunda*. *Iron* precipitates *Copper*, *Lapis Calaminaris* precipitates *Iron*, and the Liquor of fixt *Nitre* doth so to the *Lapis Calaminaris* for the same reason; but you must observe, that *Iron* does not precipitate all the *Copper*, nor the *Calaminaris* all the *Iron*, no more than the *Copper* did precipitate all the *Silver*: and the reason of this is, that the points of the *Aqua fortis* having entred more deeply into the great pores of *Copper* and *Iron*, are much the harder to be broken by bodies of this nature; but because the liquor of fixt *Nitre* does contain an Alkali much more active than the others, it precipitates all the *Lapis Calaminaris*, and all the *Iron* and *Copper* which did remain dissolved.

I shall in the sequel of this Book describe the manner of preparing the Liquor of fixt *Nitre*: the Salt that it contains reunites with the Volatile Spirits of *Salt-peter* that were in the *Aqua fortis*, insomuch that the *Salt-peter* revives again.

Crystals

Crystals of Silver, call'd, Vitriol of the Moon.

THIS Operation is a *Silver* opened, and reduced into the form of *Salt* by the acid points of Spirit of Nitre.

Dissolve one or two ounces of *Coppel-Silver* in two or three times as much Spirit of Nitre; pour forth your dissolution into a Glass-Cucurbite, set it in a gentle Sand-fire; evaporate about the fourth part of the moisture, and so let the rest cool without stirring it, it will turn into *Crystals*, which you must separate from the Liquor, and after you have dried them, keep them in a Viol well stoppt. You may again fall to evaporating half the remaining Liquor, and set it a *Crystallizing* as before. You may repeat these Evaporations and Crystallizations till all your *Silver* is turned into *Crystals*.

The Virtue. This *Vitriol of the Moon* is used to make an *Eschar* by touching the part with it. It is also given inwardly for *Dropsies*, and for Diseases of the Head, from two unto six grains, in some Specifick Water: it purges gently.

These *Crystals* might be prepared with *Oil of Vitriol*, instead of *Spirit of Nitre*, for inward use.

Remarks.

You must put your *Silver* purified by the *Coppel* into a Viol or Matrafs large enough, and pour upon it only as much *Spirit of Nitre* as will serve to dissolve it; now that comes to about twice its weight, if the Spirit be well cleared from

from the phlegm, but otherwise it must be three times as much. Indeed you may use *Aqua fortis* instead of *Spirit of Nitre*, if you please, in this Operation; but I rather chuse *Spirit of Nitre*, because it is found to act with more celerity than *Aqua fortis*. You may read in their proper places the description I have given you of them both, and the *Remarks* I have made upon them. Place your vessel in Ashes or Sand, a little warm for to hasten the Dissolution. When the *acid Spirits* begin to work upon the *Silver*, an Ebullition presently rises accompanied with a very considerable heat, because these sharp edges do break those obstacles that hindred their entrance, and violently force their passage. It is this great motion, and impetuous dispersion of parts, that produces the heat and ebullition, and by rarefaction of the *Spirit of Nitre* sends forth through the neck of the Vessel a red fume or vapour, that you must be very careful to avoid, as a thing very unwholsom, and prejudicial to the Breast. The Smoke and Ebullition do remain until the *Silver* is all of it dissolved, after which the Liquor becomes clear and transparent, but a little bluish. If the *Silver* which is dissolved, were perfectly purified from *Copper*, the solution would no more be tinged than *Spirit of Nitre*, but because there is none to be found so perfectly pure, it always tinges a little. The solution of *Plate-silver* is much bluer than that of *Silver* purified by the Coppel, because the *Plate-silver* contains more *Copper* than the other, as I said before. So that the purer the *Silver* is, the less blue is the solution. A little of it is evaporated, that the rest may *CrySTALLIZE* the easier, for that which evaporates is little better than a
kind

kind of insipid water, the *Silver* still retaining the acid fixt Spirits.

Now you must observe in all Crystallizations not to leave too much moisture, for fear of weakening too much the Salts, and so hindring their Coagulation. Nor must you leave too little moisture; for the Crystals not finding room enough to extend themselves in, would confusedly fall one upon another.

*Crystals
Purgative.*

These Crystals can be dissolved in Water like Salt, their strength depends on the *Spirits of Nitre* that are incorporated with them: wherefore they weigh more than the *Silver* did that was employed; and it is these Spirits which pierce and gnaw the flesh on which these Crystals are applied, when an *Eschar* is to be made. It is likewise they which cause that Fermentation of humours by which they purge, when these Crystals are given inwardly. The liquor in which they are dissolved to be taken, and the moisture of the Stomach do serve to correct their Acrimony.

When we consider the composition of these Crystals, there is some occasion to admire their purgative effect; for there is nothing in it which has this quality. *Silver* swallowed alone causes no such thing, and is voided again as it was taken, without any alteration: So the *Spirit of Niter*, taken alone in Water, is indeed *aperitive*, but yet it doth not purge by stool. The purgative fermentation then which this *Vitriol of the Moon* does exceed, must be ascribed to the disposition and texture of its parts.

If you have a mind to revive these Crystals into *Silver* again, you must only put them into hot Water, and lay therein a plate of *Copper*. They will

will then dissolve, and the *Silver* precipitate to the bottom in a white powder, that is to be washed and dried; afterwards melting it in a Crucible with a little *Salt-peter*, it will return into Ingots of the same weight as before.

Infernal Stone, or perpetual Caustick.

THE *Infernal Stone* is a *Silver* rendred *Caustick* by the Salts of *Spirit of Nitre*.

Dissolve in a Viol what quantity of *Silver* you please, with three times as much *Spirit of Nitre*; set your Viol in a Sand fire, and evaporate about two thirds of the moisture; pour the rest as it is hot into a good *German Crucible*, that must be large enough by reason of the Ebullitions that are made in it. Place it over a gentle fire, and let it alone till the boiling matter sinks quietly to the bottom of the Crucible. Then encrease your fire a little, and it will come to be like Oil: pour it out into an Iron mould a little oil'd and heated, it will presently coagulate or harden; after which you may keep it in a Viol well stop'd. It is a *Caustick* that will remain for ever, provided you don't let it be expos'd to the Air. This *Stone* may be made of *Copper* instead of *Silver*, but will not keep so well; because the *Copper* being very porous doth suffer the Air to enter easily and dissolve it.

If you use an ounce of *Silver*, you'll obtain an ounce and five drachms of the *Infernal Stone*.

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Remarks

Dispensatory
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Vertue.

Wight.

Remarks.

Whence this
Stone hath
its Virtue.

The Effect of this *Stone* proceeds from the Corrosive *Spirits of Nitre*, which do remain incorporated with the *Silver*. It is more *Caulstic* than the *Crystals* I now spoke of, though compounded of the same ingredients. The reason of it is, that in the Evaporation of the *Spirit of Nitre*, the sharpest part remains at last; and it is that which gives this strength to the *Infernal stone*. But in the *Crystal* there's a much weaker Spirit, as being impregnated with watry parts.

When you boil the solution of *Silver*, you must take care to keep but a gentle fire, for the matter easily rarifies, and rises over into the fire; or else it spirts some drops upon the hand of the Artist, which make it smart grievously, and fetches off the skin, because this liquor is not only very corrosive in it self, but has the assistance of fire to make it the more burning. You must likewise often cast your eye into the Crucible, especially towards the end, that so soon as the matter is observed to cease boiling, and gets the form of an Oil, you be ready to cast it into the mould, for if you should then leave it longer in the fire, the strongest Spirits would evaporate, and the stone would not be so corrosive.

Another
way of making the
Infernal
Stone.

If you would melt the *Crystals of the Moon* in a Crucible, and boil the Liquor till it come into the consistence of Oil, and afterwards cast it into the Iron mould, you would have an *Infernal stone* like this I have described.

When Plate-silver is used to the making the *Infernal stone*, an ounce of *Silver* gains but three drachms

drachms in augmentation, but using fine Coppel-silver, you'll get five drachms. This augmentation of weight does proceed from the sharp *acids* of *Spirit of Nitre*, adhering to the body of *Silver*, but the difference of the increase lies in this, that the Coppel-silver having narrower pores than the other, does retain the *acids* better, and the *stone* is thereby the stronger, as I have found by experience.

Tincture of the Moon.

THE *Tincture of the Moon* is a dissolution of some of the more rarified parts of *Silver* made in *Spirit of Wine* whetted by Alkali salts.

Precipitation of Silver by Sea-salt.

Dissolve in a Matrafs upon Sand a little warm two ounces of *Silver* with six ounces of *Spirit of Nitre*. Pour the dissolution into a Cucurbit, or other Glass-vessel, wherein you shall have put a quart of Salt-water well Filter'd, the *Silver* will presently precipitate in a very white powder. Let it lie a-while that all the powder may fall, and then pour off the water by Inclination. Wash your Powder several times with Fountain-water to take away the Acrimony of the Salts: dry it upon paper, and put it into a Matrafs. Pour upon it an Ounce of the Volatile Salt of Urine, and four and twenty Ounces of the Spirit of Wine rectified with the *Salt of Tartar*, after the manner I shall shew hereafter. Stop this Matrafs with another: that is to say, let the mouth of the one enter into the neck of the other, and this is that which is called a *double-vessel*. Lute well the junctures with a wet bladder, and digest the mat-

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ter in horse-dung, or some such gentle heat, for a Fortnight, during which time the *Spirit of Wine* will have got a bright Sky-colour. Unlute your Matraſs and Filtrate the Liquor through a Coffin of Brown paper, and ſo keep it in a Viol well ſtopt. You may uſe this *Tincture* for the Epilepie, Palſie, Apoplexy, and other diſeaſes of the head. It is alſo uſed in Malignant Feavers, and all other Diſeaſes wherein it is requiſite to drive out the humours by Perſpiration. The Doſe is from ſix to ſixteen drops in a convenient Vehicle.

Virtue.

Doſe.

*Silver
Calx.*

There will remain at the bottom of the Matraſs a *Calx* of Silver that may again be revived by means of the following Salts.

Take Eight ounces of *Nitre*, Two ounces of Crystal powdered according as I ſhall thew hereafter, ſo much *Tartar*, and half an ounce of coals; Powder them all, and put it by little and little into a Crucible heated red-hot, a great Detonation will happen, after which you'll find the matter melted, pour it into a warm Mortar, and let it cool, you'll have a Maſs that you muſt powder, and mix an equal weight of it with ſo much *Calx* of *Silver*. Melt this mixture in a Crucible over a ſtrong fire, and the *Calx* will revive into Silver: take your Crucible out of the fire, and break it when it is cold, then ſeparate your Silver from the ſalts.

Remarks.

This Operation ſeems at firſt to favour the opinion of thoſe who hold there can be a ſeparation of the Principles of Silver: for, ſay they, what is it can give this blue colour, after that the Silver

ver hath been a long time digested with the Volatile Salt of Urine, and the *spirit of wine Alcoholyzed*, but an inward sulphur of the Silver that separates from it by the means of this sulphureous Liquor, and mixes with it, much after the same manner as we find these sorts of *Menstruums* usually dissolve the sulphur of Vegetables, Animals, and Minerals, and let alone their terrestrious and saline parts? But when we consider this Tincture a little nearer, we shall find it to be nothing but a dissolution of some part of the Silver and Copper that hath been volatilized by the salt of Urine, and afterwards united with the spirit of Wine; so that if you draw off, or revive these dissolved Metals, there will remain no longer a Tincture, and this is the way for you to do it.

Pour your *Tincture of the Moon* into a Glass Body, cover it with its head, and fit a Receiver to it, lute the junctures close, and distill in a Vaporous Bath, about half the moisture, and you'll have a Liquor as clear as spirit of Wine. Put your Cucurbit into a cool place, and leave it there two days without stirring it, you'll find little Crystals on the sides, pour off the Liquor gently, which hath lost now much off its Sky-colour. Gather your Crystals, and continue to distil and crystalize the rest of the Liquor, till you have recovered all that is in it. Mix all your Crystals, dry them without a fire, and weigh them; and if you have half an ounce of them, powder them, and mix them with six drachms of the matter I described for reviving the *Calx* of Silver remaining in the *Matras*; put this mixture into a Crucible, and covering it with a tile, light a strong fire about it, to put the matter into fusion; then taking it off

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the fire, and letting it cool, break the Crucible, you'll find the Silver at the botom, which will be fit for the same Operation again, when you please. Note that all the Liquor which was drawn by Distillation, is as clear as common water: wherefore I conclude that the Colour did consist in the dissolution of Silver it self, and not of its sulphurs, as some have thought.

You must cut the Silver into little pieces or plates, that it may dissolve the more easily.

The Salt-water must be made of an ounce and a half of Salt dissolved in a quart of water: this salt precipitates the Silver, because it engages the points of the dissolvent, and shaking them violently about makes them let go the hold they had with other bodies. I shall speak more at large concerning these kinds of Precipitations in the Remarks which I shall make upon White Precipitate, and shall then explicate the reason why Sea-salt, which is an *acid*, does precipitate that which another *acid* had dissolved. I shall likewise answer the objections which have been raised on this subject.

Silver may be also precipitated by means of a Copper-plate, as I have said already.

It is very indifferent which way you please to precipitate it, for it is done for no other end; but to reduce the *Silver* into a very fine powder, for an easier dissolution.

The Precipitate of *Silver* made with salt, or Copper, waxes brown in the drying, and though dried in the shade, which doubtless is by reason of some small proportion of Copper that it contains.

If you have dissolved an ounce of *Coppel-silver*,
and

and precipitate it with Salt or Copper, you'll draw an ounce and three drachms of Precipitate well washed and dried; this augmentation does proceed from a remainder of the points which were broken in pieces, and yet do still remain in the pores of the metal; for these pores being very small, they do but hardly let go what they have received into them.

There is no need of distilling a part of the Liquor, that the Tincture may be the stronger, as some have presumed to write: for on the contrary, it causes a Crystallization, which diminishes both its colour and strength, for the reason I have given before.

The effect of this Tincture for Diseases must rather be attributed to the Salt of Urine, and Spirit of Wine, than to the Silver; for they are not only able to fly into the Head, and open obstructions there, but assisted with the natural heat do open the pores of all the Body, and drive out ill humours by transpiration.

The portion of Silver which remains at the bottom of the Matraſs being impregnated with volatile parts would fly into the Air, if it were melted alone without the addition of something else; wherefore the abovementioned matter is added to it, that being of a very fixt nature may weigh it down, and hinder it from flying away.

Diana's Tree, or, Philosophical Tree.

THIS Operation is a mixture of Silver, Mercury, and the Spirit of Nitre, Crystallized together in the form of a small Tree.

H 4

Take

Take an ounce of *Silver*, and dissolve it in two or three ounces of spirit of *Nitre*, pour your dissolution into a Matrafs, wherein you shall have put eighteen or twenty ounces of water, and two ounces of Quick-silver. Your Matrafs must be fill'd up to the neck; let it lie still upon a little round of straw in some convenient place for forty days together, during which time you'll find a Tree spread forth its branches, and little balls at the end, which represent their fruit.

This Operation is of no use at all in Physick, I have here describ'd it only to please the curious.

Remarks.

These branches do proceed from the spirit of *Nitre*, which being incorporated with the *Silver* and *Mercury* do form divers Figures, according to the room and moisture it hath to expatiate it self in. For if you should put to it but ten or twelve ounces of water, nothing but a kind of Crystals in great confusion would be able to appear. On the contrary, if you should use too much water, nothing would then be seen besides a little precipitated powder. You must let the mixture lie still for forty days together, because the spirit of *Nitre* being very much weakned by common water is able to work but very slowly. If the matter should happen to be removed, the figure would quickly fall into confusion, but would recover it self again, if you let it lie still long enough. This Preparation is best performed in a cool place, being properly a Crystallization.

This Operation may be fitly compared with the manner of Generation and nourishment of Plants
in

in the Earth; for if the seed abounds with too much moisture, the spirits which serve to ferment and dilate its parts, will be rendred so weak, as not to be able to act, and so nothing can be produced; if on the contrary there should prove too little moisture, the spirits not finding room enough to expatiate in, would either continue imprisoned or evaporate into Air, and so be ineffectual. But when there happens to be a fit proportion of water in the Earth, then the spirits gently moving about do insensibly expatiate themselves, and do rarifie and sublime along with them the substance of the seed, from whence Vegetation doth proceed. But to return unto our Operation.

If you should desire to separate the *Silver* from the *Mercury*, shake the whole together, and having poured it out into an earthen Vessel, make it boil for half a quarter of an hour, then let it cool a little, till it becomes a little more than lukewarm; pour upon it a quart of water by little and little, in which you have dissolved two ounces of Sea-salt, and a white *Precipitate* will fall down; pour off the water by Inclination, and dry the Powder. Then put it in a Retort placed in a Sand-furnace, and having fitted to it a Receiver fill'd with water, give a small fire at first, then encrease it by degrees till the Retort grows red-hot, and your *Quick-silver* will distill drop by drop into the water; continue the fire till nothing more will distil; let the vessels cool; pour the water out of the Receiver, and having wash'd the *Mercury*, dry it with linnen, or the crum of bread, and keep it for use.

You'll find your *Silver* in the Retort, which you may reduce into an Ingot, by melting it in a Crucible

*Separation
of the Sil-
ver from
Mercury.*

Crucible with a little Salt-peter in a great Circular fire.

I once Calcin'd in a Crucible the precipitate, instead of distilling it, fancying, that the *Mercury* would evaporate, and the *Silver* remain; but all did flie into the Air, with some noise: Nor did any thing remain in the Crucible, so much had the *Silver* been volatiliz'd by its conjunction with the *Mercury*.

Another
way of ma-
king Dia-
na's Tree.

We may make another *Tree of Diana*, as followeth. Dissolve an ounce of *Coppel-silver* with three ounces of *Aqua fortis*, in a Viol or small Matrafs; set this Vessel in sand, and by a small fire evaporate about half of the moisture; then add to it three ounces of good distill'd Vinegar, let it be a little hot, stir the mixture, and put your *Matrafs* in some place, to lie at rest about a month, and there will arise, even unto the height of the liquor, a shrub like to a Firr-tree.

This Philosophical Tree is but a kind of Crystallization, made of *Silver*, penetrated by the acids of *Aqua fortis* and Vinegar. The *Silver* may be reviv'd by pouring Salt water upon it, to precipitate it into a white Powder, and melting this Powder by a great fire in a Crucible, together with a little *Borax* or *Salt-peter*.

CHAP.

CHAP. III.

Of Tin.

TIN, called by the Ancients *White Lead*, is a Metal that comes near unto *Silver* in colour, but differs very much, in the figure of its Pores, and in the solidity and weight. The name of the Planet *Jupiter* is given unto it, and it is thought to receive its particular Influence from it. It is a malleable substance, Sulphureous, and very easie to put into Fusion. It is found in several Mines, especially in *England*, which for that reason is called *The Isle of Tin*. It will not all of it quite dissolve in *Aqua fortis*, as some have affirm'd, but some part will remain undissolved, which shews it is compounded of different parts, and that its Pores are of a different figure. A Virtue hath been attributed to it against the Diseases of the *Liver* and *Matrix*, but this quality is only imaginary, experience in no wise evincing the truth of it.

The best *Tin*, is that which cometh in Pigs from *Cornwal* in *England*, it is called *Plate-Tin*, and is to be preferred to all others, for the Operations in Chymistry. The common *Tin*, which is sold at Potters, is only a little *Lead*, and yellow *Brass*, with which it is allay'd.

Bell-metal is *Tin* mixt with *Bismuth*, or *Antimony*, or some other metallick matter, whose parts are hard and brittle, and which being mixt with *Tin*, do thicken it, and render it harder,
more

more solid and compact: And hence it is, that it yieldeth a sound: For to make any matter to give a sound, the parts of which it is compounded must necessarily be hard, and so ordered, That when they are struck upon, they may act upon one another, which *Tin* of it self can never do, because it is soft and yielding.

Pulverization of Tin.

T*IN* being of a malleable nature, cannot be reduced into a Powder after the usual ways of powdering. Therefore I'll give you a method how to do it easily enough.

Melt in a Crucible what quantity of *Tin* you think fit, and cast it into a round wooden box, that has been rubb'd within on all sides with a piece of chalk, enough to whiten it, cover this box, and presently shake it about, until your *Tin* is become cold, and so you'll find it converted into a gray powder.

Lead may be *Pulverized* after the same manner.

Remarks.

The wooden box must be round, because that figure is the most proper to shake a thing in; and the clefts of the box must be joyned together as close as may be; and but little of the *Tin* must be put into the box at a time, that the parts may be the better able to separate and fall into a powder, by means of the motion or agitation. Indeed the thing may be done without rubbing the box

box with chalk, but by this means the melted *Tin* is hindered from burning the box, as it otherwise would. Now though this Operation may seem to be of no great use, nevertheless it will be found to be of very good use, in order to prepare several Operations upon *Tin*. For by this means it will easily mix with Salts, and other matters.

Calcination of *Tin*.

TO Calcine *Tin*, is to reduce it into the form of a *Calx*, by the means of fire.

Put English *Tin* into a large earthen Pan unglazed, place it in a circular fire, the *Tin* will melt. Stir it with a *Spatule*, until it is reduced into Powder; continue a great fire to it 36 hours, and stir it from time to time, then take it off the fire and let it cool, and you'll have a *Calx* of *Tin*.

Remarks.

I use an unglazed earthen vessel, because the *Lead* which makes the varnish might mix with the *Tin* and so hinder the purity of it; a Pan is the figure that's proper for this *Calcination*, for being able hereby to spread the matter about with a *Spatule*, its Sulphurs fly away the more easily; insomuch that *Tin* may be as well *Calcined* in such a vessel in six and thirty hours, as in four days time in a Crucible; the stirring it does likewise serve to drive out the Sulphur.

One would think that *Tin* should lose of its weight in *Calcination*, seeing the fire evaporates a part of its Sulphur: but yet the contrary happens;

Tin encreaseth by Calcination.

pens; for if you take 32. ounces of this Metal, it will yield 34. again, which must be by reason that there enters into the place of the *Sulphur*, and other volatile matter, which is evaporated, a greater quantity of igneous particles. In my *Remarks* upon the Calcination of *Lead*, I intend to speak more fully of the like augmentation.

A Curiosity. If when *Tin* is reduced into the powder in the earthen pot, you take a quantity of it before it be further Calcined, and mix it with about as much *Silver* dissolved, precipitate with salt water, and dry'd again, yet so as that there remaineth still some little moisture, this mixture will turn hot, and take fire of it self, and send forth a sulphureous smell.

This surprising effect must be caused only by the remaining points of the Spirit of *Nitre* and *Sea-salt*, which are incorporated with the precipitate *Silver*, and which fixing upon the *Tin* do penetrate its pores with such violence, that they kindle the Sulphur.

If you make the Experiment of *Tin* altogether Calcined, there will be no Inflammation, because that the Metal then is deprived of its Sulphur before the mixture.

Salt of Jupiter of Tin.

THIS Operation is a *Tin* penetrated by acids, and reduced into the form of a Salt.

Take two pounds of *Calcined Tin*, put it into a Matraass, and pouring upon it distilled *Vinegar* to the height of four fingers, set it digesting in hot Sand, for two or three days, shaking the vessel

vessel from time to time; afterwards pour off the liquor by *inclination*, and adding more distilled *Vinegar* to the matter remaining, digest it as before, decant the liquor, and repeat the adding new distilled *Vinegar*, and digesting it, three or four times more: then Filtrate all these impregnations, and evaporate them in a glass Body in a fire of Sand to the consumption of three quarters of the liquor, let the remainder cool, and then remove the Body, without shaking it, into a Celler, or such like cold place, to lye still three or four days, and you'll find Crystals formed on the sides of the Body; separate them from the liquor, and evaporate some more of it: put that which remains into a Celler as before, and you'll find new Crystals; continue these evaporations and crystallizations, until you have drawn all your Salt of *Tin*, which you must dry in the Sun, and keep in a Viol. This Salt is desiccative, when mixed in *Pomatus*; it may also serve for Tettars.

Those who do not concern themselves to have this Salt in Crystals may evaporate all the moisture of this dissolution, over a small Fire, and they will have a Salt remain to them as good as the first.

Remarks.

This Salt is only compounded of the *acid* part of the *Vineger*, incorporated into the *Tin* after the resemblance of Salt, but if you should destroy these *acids*, the *Tin* would resume its former shape. I shall shew the way of this Revivification, when I shall treat of Salt of *Saturn*, both being performed after the same manner.

If

If the *Calx* of *Tin* had not been well *Calcined*, and dispossest of some quantity of *Sulphur*, the acidity of the *Vinegar* would never have been able to dissolve it, because it would have been presently shockt in the supple yielding parts of the *Sulphur* without a capacity of acting; for that an *acid* may be capable of dissolving a body, it is requisite that the pores be fitly disposed, so that it may preserve its motion sometime in which it may make its jostles.

The *Cornwal* or English *Tin* is to be used in this operation; for the ordinary *Tin* will only give a Green and Sharp Salt, because it contains some quantity of *Copper*.

You may separate one part of the impregnation of the *Calx* of *Tin*, and pour upon it the Oil of Tartar *per deliquium*, and you'll have a Magistery of *Tin*, because the Oil of Tartar which is an Alkali destroys the *acid* of *Vinegar* which kept up the *Tin* dissolved, and forces it to let go its hold; you must wash this Magistery, and dry it, it serves for the same uses as that which I shall describe hereafter, but there is but little Magistery got by this preparation.

If a man would persist to *Calcine* the *Calx* remaining in the Bolt-head, and put more *Vinegar* to it, it would at last all dissolve, but the Operation would be too tedious.

The Spirit of *Nitre* alone makes no impression upon the *Calx* of *Tin*.

Sublimation

Sublimation of Tin.

TC Sublime *Tin* is to raise and volatilize it by means of a Volatile Salt.

Take one part of *Tin*, and two parts of *Sal Armoniack* in Powder: mix them well together, and put your mixture into a strong earthen Cucurbite, that is able to endure the fire, and whose two thirds at least do remain empty; fit unto it a blind Head, lute the conjunctions exactly well, and place your Vessel on the grate in a small Furnace with an open fire, but only open so as that the fire can pass through the Registers, and for that end you must stop up the top of the Furnace with Bricks and Lute, leaving some little holes on the sides that are called Registers. The Cucurbite must likewise enter the Furnace a third part of its height or thereabouts. Give a small fire at first, then encrease it by degrees, till the bottom of the Cucurbite is grown red-hot, and continue such a fire till nothing more will Sublime, which you'll know by the Head's growing cool, and then the Sublimation is at an end. Let the Vessels cool, and so unlute them, you'll find *Flowers* stuck to the Head, and to the top of the Body, that are nothing else but some parts of *Tin* raised up by the *Sal Armoniack*, and at the bottom of the Body you'll find some *Tin* Revived.

Magistry

Magistery of Jupiter, or Tin.

THIS Operation is only a *Tin* dissolved by an *acid*, and precipitated by an *Alkali* salt.

Dissolve the *Flowers of Tin*, in a sufficient quantity of Water. Filtrate the Dissolution, and pour upon it drop by drop the Spirit of *Sal Armoniack*, or the Oil of Tartar made *per Deliquium*, there will precipitate a very white Powder. You must Edulcorate it by washing it several times with warm water, and afterwards dry it. It serves for Paint; for being mixed with *Pomatum*, it makes a very curious White.

Use.

Remarks.

It is to be considered in both these Preparations, that the Dissolution of *Tin* is performed only by an *acid* Salt, which the *Sal Armoniack* is impregnated with; and this is the reason why the Volatile Spirit of *Sal Armoniack* doth serve to precipitate it; for being an *Alkali* as well as the Oil of Tartar, it breaks the force of the *acid*, which therefore lets go what it held dissolved. That being granted, there will be no longer difficulty in conceiving how the Volatile Spirit of *Sal Armoniack* doth often precipitate what *Sal Armoniack* had dissolved.

Flowers

Flowers of Jupiter, or Tin.

THIS Operation is a *Tin* Volatilized, and raised in form of Meal, by the means of a Volatile Salt.

Take an unglazed earthen Pot, with a hole in the middle of its height, and a stopple to it, place the Pot in a Furnace of a just proportion wherein the pot may enter only as high as the hole, and with Bricks and Lute, take care that the fire may not transpire; fit upon this pot three *Aludels*, or open pots of the same earth without any bottoms, and fit a Head to the uppermost with a Receiver to the Head, lute well all the junctures, and light a good fire in the Furnace to make red-hot that part of the pot which lies within it, then mix a pound of *Tin* and two pounds of purified *Salt-peter*, throw a spoonful of this mixture through the hole of the pot, and stop it; a detonation soon follows, which when it is over, throw in another spoonful, and so continue to do, until all the mixture be spent; let the vessels cool, and unlute them, and you'll find in the receiver a little Spirit of *Nitre*, and in and round about the *Aludels* very white *Flowers of Tin*, gather them together with a feather, then wash them divers times with fountain water, and when you have dried them on paper in the shade, keep them in a Viol; they serve for Paint, and they make a curious White when mixed in *Pomatuins*, or in some liquor.

Use.

You'll find in the bottom of the Pot a *Calx* of *Tin* mixed with the sixth part of *Salt-peter*, boil it in water, wash and dry it, and it may be used in desiccative unguents.

*Calx of
Tins*

I 2

Remarks

Remarks.

It is a plain sign that *Tin* does contain a *Sulphur*, because being mixed with *Salt-peter*, and put into the pot that's heated red-hot, it will flame; for you must not imagine that the detonation can proceed from the *Salt-peter* alone, this salt being never able to flame without the mixture of some Sulphureous matter, as I shall prove in its own place. But because the *Sulphur* of *Tin* is lockt up in other substances, it remains quiet for some time to unite with the *Salt-peter*, before it raises a detonation. Nevertheless if you be in haste to dispatch, the detonation may be expedited by introducing a small cole lighted into the hole of the pot to fire the matter.

These *Flowers* do proceed from the part of *Tin* which is easiest to rarifie, and which the Volatile salt of *Salt-peter*, and the *Sulphur* of *Tin* had raised.

You must take care, when you would make Detonations, to proportion the *Salt-peter* with the *Sulphur*, for otherwise they will not endure so long as they should; either there being too much *Sulphur* it will not meet with enough Volatile parts of *Salt-peter* to raise it all up, or else the *Salt-peter* being in too great a quantity for the *Sulphur*, it causes but a Sublimation in part, because the great quantity of this salt which remains at bottom, without firing, does fix some part of the *Sulphur*. Wherefore there was but little reason to believe that three parts of *Salt-peter* to one of *Tin*, would raise more *Flowers*, than when there are but two, according to my description. For then

then there being too much *Salt-peter* for the quantity of *Tin*, the Detonation will prove imperfect, and almost all the *Salt-peter* will remain at bottom, and will only serve to check some part of the *Sulphurs of Tin*, hindring them from Subliming into so many *Flowers* as would otherwise rise.

Three *Aludels* and one Head, are used in this Operation, that the Vapours which rise in the time of Detonation may have room enough; for otherwise they would burst the Vessels, notwithstanding the casting in of the matter but little at a time.

The *Flowers of Tin* are washt in order to deprive them of a Volatile Salt derived from the *Salt-peter* which was mixed with it, and the salt dissolves in the water, leaving the *Flowers* in their purity. You must dry them in the shade, for both the Sun and fire do render them black, and this because they do re-unite the particles of *Tin*, which owe all their whiteness to the fineness of Pulverization, which gives them another Superficies than they had to reflect the light with.

*The Antiseptic of Poterius, or, Jupiter
Diaphoretick.*

THIS Operation is a mixture of *Tin*, and the *Regule* of Antimony with *Mars* fixed by *Salt-peter*.

Take of the finest *Tin*, and of the *Regule* of Antimony with *Mars*, which shall be described hereafter, of each eight ounces, dissolve them together in a Crucible upon a Charcoal-fire, and

1 3

pour

pour the matter dissolved into an Iron Mortar, heated and greased; let it cool, then beat it into powder, and mix with it three times as much *Salt-peter* purified. Set a great Crucible amongst burning Charcoals, and when it is red-hot, throw into it two spoonfuls of your mixture, the matter will dissolve, and make a great detonation, which being over, put in again two or three spoonfuls more of your mixture; and when the detonation is past, throw in more, till all be done, afterwards Calcine it about an hour in a great fire, stirring it now and then with an Iron spatule, and then let it cool.

Pour all the matter into an Earthen Pot, add to it a great quantity of boiling Water, and let it steep therein five or six hours for dissolving the *Salt-peter* which remains in it: pour off the water by inclination, and add more to it; continue thus to wash the matter, until the Water (which runs off) tastes insipid; then dry it, and keep it. This is the *Antibetick*, of which you shall have twenty ounces.

Uſe. They use this for diseases of the Liver, and of the Matrix, for Malignant Feavers, for the Small-Pox, and upon other occasions, where it is necessary to remove the humours by Transpiration. They give it also for stopping a *Gonorrhoea*, an Issue of Blood, and bleeding at the Nose.

Dose. The Dose is from Ten Grains to Two Scruples, in some Conserve, or other proper Liquor.

Remarks.

By fine or pure *Tin*, I do not mean Bell-metal, which is mixed with *Marcasites* and brittle matter,

to render it hard, clear, and smooth, as I have observed before, nor yet any other sort of *Tin* Fine Tin. but *English*, purified from its dross, and with which no other matter is mixed.

This *Tin* is dissolved with the Regule of Antimony to make a Mass or Lump which may be beat into powder; and the Mortar is greased, that it may not stick to it.

Seeing the Sulphur of *Tin* is very well united, and cloed up by the other principles of which this Metal is compounded; and seeing the Regule of Antimony is deprived of the grossest part of its Sulphur. Therefore the detonation happens sometime after the powder is cast into the red-hot Crucible; because the Sulphur of *Tin*, and what remains in the Regule of Antimony must be allowed sometime to disengage themselves, and to joyn the volatile particles of *Salt-peter*, that they may be exalted together. The matter Projection, is injected into the Crucible by little and little, which is called projection, that there may be nothing lost by the detonation; for if the mixture were thrown in all at once into the Crucible, the detonation would be too strong, and would carry over some of the matter into the fire. After the detonation is past, the matter is very much swelled, rarified, and of a gray colour: It is again Calcined, and stirred, that the fixed *Salt-peter* may penetrate it well, and that what remains of the volatile part of Antimony may be evaporated.

There is in this Operation used Triple *Salt-peter* Why Triple for uniting and fixing the parts of Antimony; Salt-peter is used. for if less were used, it is to be feared, That the saline Sulphurs of this Mineral, not
 1 4 being

being weighty enough, would not cause Vomiting.

The Detonation carries away some of the Sulphurs of Antimony and Tin, but it is not sufficient to fix the Vomitive quality: for when there are equal quantities of *Salt-peter* and the Regule, the detonation is as much as when there are three parts of *Salt-peter* to one of the Regule, because even then the volatile part of *Salt-peter* is proportion'd to the Sulphur of the Regule. But seeing the preparation must be Vomitive, because there is not enough of the fixed *Salt-peter*, to fix and incorporate the parts of Antimony, therefore it is necessary to use as much *Salt-peter* as I have described.

This Operation is much like to that of Antimony Diaphoretick, and their Virtues are almost the same. It is pretended, That this *Antibetick* is good against the diseases of the Liver and of the Matrix, because of the Tin in it, which Astrologers recommend on such occasions: But if this Remedy bring any Relief, I would attribute its effect at least as much to Antimony as Tin.

Without leaving the matter to cool, we may pour it hot into the Water, and so it will come more easily from the Crucible: But if it be left to cool in the Crucible, it will not be so easy to separate. The water must be boiling hot, and it must be left to steep for some time, that the salt may melt, and all the matter be separated.

This *Antibetick*, well washed and dried, may be reduced into a grey Powder, which they make more fine by beating it in a Marble.

If the Lotions or Water poured from the *Antibetick* be set to evaporate, 32. ounces of an acid

A Salt
drawn from
the wash-
ings of the
Antibe-
tick.

acid Alkali Salt may be got from it; which being thrown upon burning Charcoals, will excite a small flame. This sheweth, That all the volatile part of *Salt-peter* was not wasted by the detonation: For if the *Salt-peter* was entirely deprived of its Volatile parts, it could not burn in the fire, as I shall shew in the Operation of *Nitre* fixed by Charcoal: but there must of necessity remain some Volatile in this Salt, seeing, in a mixture of three parts of *Salt-peter* and one of *Regule*, there could not be a great enough proportion of Sulphur, for uniting the Volatile parts of all that *Salt-peter*, and for causing that violent Exaltation, which they call detonation: for *Salt-peter* makes no noise but according to the proportion of Sulphur with which it is mixed; and when there is no Sulphur it does not burn.

This Salt which is drawn from the Lotions of the *Antihætick* is made *Alkali* both in the detonation and in the Calcination, because the fire, by passing and repassing into its pores, has widen'd and made them capable of receiving the points of *acids*.

It would seem, That there should be more than four ounces of fixed *Salt-peter* in the *Antihætick*, seeing it weighs 20. ounces, and that there were only sixteen ounces of *Tin* and the *Regule* of Antimony made use of, and that by the detonation some of the Sulphur of these matters has been destroyed, which should diminish their weight: But this encrease may come, not only from the *Salt-peter*, but also from some igneous particles which may have mixed themselves into the matter, seeing we see, that *Tin* and the
Regule

Regule of Antimony being Calcined separately, without the addition of other things, do encrease in weight.

There are lost, in this Operation, sixteen ounces of *Salt-peter*, for 48. were made use of, and only 32. ounces of Salt are recovered from the Lotions.

Vertue.

This Salt is used for removing Obstructions, for exciting Womens Courfes, against the Drop-sie, and for dissolving the Glands of the Mesentery. The Dose is from eight grains unto a scruple.

CHAP. IV.

Of Bismuth, called Tin-Glass.

Bismuth is a Metallick Matter, White, Smooth, Sulphureous, like to *Tin*, but hard, sharp, brittle, disposed into *Facets*, or shining scales, as pieces of Glass, whence it has its name, Authors are not well agreed about its History: The Ancients thought it a natural Marcastite, or an imperfect *Tin*, which was found in *Tin Mines*; but the Moderns judge, with more probability, That it is only a Regule of *Tin*, prepared artificially by the *English*. But however, it is certain, That good *Bismuth* may be made with *Tin*, *Tartar*, and *Salt-peter*: some mix *Arsenick* also into it. Its pores are disposed in another manner than those of *Tin*, which is evident enough, because the *Menstruum*, which dissolves

dissolves *Bismuth*, cannot dissolve *Tin*.

Bismuth is never used in Cures taken inwardly, *use*. because it is believed, that it is mixed with a little *Arsenick*, *Pewterers* mix it with their *Tin*, to make it look fairer, and to give it a sound.

Marcaffite, is a general name for all Metallick *Marcaffite*. matters, but it is appropriated to *Bismuth*, because of its excellency; for it surpasses all other *Marcaffites* in beauty.

There is another kind of *Marcaffite* called *Zinck*, which much resembles *Bismuth*, but is *Zinck*. not so brittle; it serves to purifie *Tin* from its dross, and to render it whiter: they only use to put a small quantity of this into *Tin*, when it is melting upon the fire. This *Marcaffite* is also *use*. used in Soldering.

Flowers of *Bismuth*.

THIS Operation is nothing but a portion of *Tin-glass* raised up in form of meal by Volatile Salts.

Calcine *Bismuth* as you do *Lead*, then mixing it with an equal part of *Sal Armoniack*, proceed to its sublimation as you did in that of *Tin*. Thus you have *Flowers*, which you may dissolve in Water, and precipitate with the Spirit of *Sal Armoniack*, or Oil of Tartar.

This *Magistery*, or *Precipitate* serves for the same use as that which follows.

Magistery

Magistery of Bismuth.

Magistery of Bismuth is a Tin-glass dissolved, and precipitated in a very white powder.

Dissolve in a Matraass an ounce of *Bismuth*, grossly powdered with three ounces of the Spirit of Nitre. Pour the Dissolution into a clean White-ware Vessel, and pour upon it five or six pints of Fountain-water, in which you shall have dissolved before-hand an ounce of Sea-salt, you'll see a White powder Precipitate to the bottom. Pour off the Water by Inclination, and wash this *Magistery* several times, then dry it in the shade, you shall have an ounce and a drachm of it. It is an excellent *Cosmetick*, called *Spanish white*, that serves to whiten the complexion. It is either mixed in *Pomatum*, or *Lily-water*. Periwig-makers also use it for making the hair bright, and fair.

Remarks.

You must use a large *Bolt-head* to dissolve the *Bismuth* in, because the great *Ebullition* that happens, as soon as *Spirit of Nitre* is cast upon it, requires room to move in. You must likewise have a care as much as you can, of receiving the *Vapours* at your Nose or mouth, for they are very offensive to the breast.

Cause of the great Ebullition. This quick and violent *Ebullition* proceeds from the *acids* immediate penetration of the large pores of *Bismuth* so soon as thrown upon it, and the *acid* violently divides all that opposes its motion. It happens also that the *Bolt-head* grows so hot, that

that a man cannot endure his hand upon it, because the points of the *Menstruum* do chafe against the solid body of *Bismuth* with such force, that you may observe from thence much the same heat, as when two solid bodies are rub'd against one another. Add to this, that the great store of igneous particles contained in *Spirit of Nitre*, may much increase this heat.

If the *Dissolution* becomes turbid through some impurities in the *Bismuth*, you must pour into it about twice as much *Water*, and filter it; for if you should go to filter it without water, it would coagulate like salt in the *Filter*, and not pass through. This *Coagulation* proceeds from the acid spirits of *Nitre* that are included in the particles of *Bismuth*, which finding too little liquor to swim in and disperse, do gather together into *Crystals* when the *dissolution* is cold.

The impurity which commonly swims upon the solution of *Bismuth*, is a fat or bituminous matter which will not dissolve in the *spirit of Nitre*.

This *Magistery* may be made by pouring in great quantity of Fountain water without any salt, into the *dissolution*, but it is made the quicker, when you use salt, and the *Precipitation* is the better, because salt does encounter and break some of the acid that water alone was not able to weaken sufficiently.

Sea-salt
hastens the
Precipitation.

Now some difficulty appears in conceiving how plain water alone comes to precipitate *Bismuth*, *Lead*, & *Antimony*, which the acid had dissolved, and yet can do nothing at all to the precipitating *Gold*, *Silver*, or *Mercury*, without the assistance of some salt or other body; I do imagine that the former having large Pores, the acid cannot stick so close

in

in them, but that *water* is able to force them out; but *Gold*, *Silver* and *Mercury*, having finer pores in comparison than the other, do retain the *acids* so very closely that the weak impulses of *water* alone can make no separation; some more active body is requisite to do it.

The Augmentation which happens to *Bismuth* when made into a *Magistery*, does proceed from some part of the *Spirit of Nitre* that remains still in it, notwithstanding the Precipitation and Lotion.

Dose. Commonly one Drachm of this *Magistery* or *Precipitate* is mixed with four ounces of the *water of Lily* or *Beans*, or in an ounce of *Pomatum*.

Vertue. It softens the skin very much, and is also good against the Itch, because it feeds upon those *acids* or *Salts* which cherish this Disease.

CHAP. V.

Of Lead.

LEAD is a Metal fill'd with Sulphur, or a Bituminous Earth, that renders it very supple and pliant. It is probable that it contains some *Mercury*. It hath Pores very like those of *Tin*; it is called *Saturn* by reason of the influence it is thought to receive from the Planet of that name.

This Metal is found in many Countries fixed to divers sorts of Stones and Earths, some of which contain *Silver*, and some both *Gold* and *Lead*.

*Where
Lead is
found.*

Lead-Ore is black, much like to that of *Antimony*, it is divided into small points or clear Flakes. What is mixed with the *Silver* is clearest, more smooth and bright.

The colour of Lead Ore.

They melt *Lead Ore* in a proper Furnace: As it melts, the *Lead* runs out, by a Pipe purposely fitted to the Furnace, and the Earth remains amongst the coals: and if there be any *Gold* or *Silver* amongst the *Ore*, it is to be found there too; for these Metals not dissolving so soon as *Lead*, continue with the Earth, which must be purified, as I have shewed in its proper place, provided it be worth the while. But sometimes there is so little, That the profit will not quit the cost.

Purification of Lead.

If there be any considerable quantity of *Silver* or *Gold* mixed with *Lead-Ore*, it is to be separated by means of the *Coppel*.

Those who work upon *Lead* are subject to Colicks, and to become *Paralytick*, whether it be that there rises out of it a *Mercury* which obstructs the Nerves, or else that the very substance of *Lead* does act upon them after the manner of *Mercury*.

The bad effect of Lead.

Lead is extremely cold, and for that reason is proper to assuage the heats of *Venus*, being applied to the *Perineum*; and it may be the heat of the skin causes it to lose some particles, which insinuating through the pores do some way fix the Spirits and qualifie their motion, from whence the part waxes cold: it is also applied on many Tumours caused by too great an Ebullition of the Blood.

Venus.

Lead serves to purifie *Gold* and *Silver*, and may be said to act in the *Coppel*, much after the same manner

How Lead purifies Gold and Silver.

manner as the white of an Egg does in *Clarifying* a *Syrup* that's boil'd in a *Bafon*; for as the gross and terrestrious impurities of a *Syrup* do stick to the white of an Egg by reason of its glutinous nature, and are driven to the sides of the *Bafon* in the stirring; so do the *Heterogeneous* parts that were mixt with *Gold* and *Silver*, stick unto the *Lead*, and by the fire are driven to the sides of the *Coppel* like unto a *Scum*.

Calcination of Lead.

Melt *Lead* in an earthen Pan unglazed, and stir it over the Fire with a *Spatule* till it is reduced to a powder. If you increase the Fire, and still *Calcine* the Matter for an hour or two, it will be more open and fit to be penetrated by acids.

If you put this Powder to *Calcine* in a *Reverberatory Fire* for three or four hours, it will be of a red colour, and is that which is called *Minium*.

Minium.

Cerusse.

Lead is also prepared into *Cerusse* or *White-Lead* by the means of *Vinegar*, whose vapour it is made to imbibe; for it turns into a *White Rust*, that is gather'd up, and little *Cakes* made of it.

Two parts of *Lead* may be melted in a *Pot* or *Crucible*, and one part of *Sulphur* added to it; when the *Sulphur* is burnt out, you'll find the matter turned into a black powder, which is called *Plumbum ustum*.

Plumbum
ustum.

Vetue.

All these preparations of *Lead* are of a drying nature; they may be mixed with unguents and plaisters, they unite with Oils or fat substances in the boiling, and they do give them a solid consistence,

sistence, and the greatest part of our plaisters do derive their hardness from it.

I spoke of the way of reducing *Lead* into *Litharge*, when I treated of the Purification of *Silver* by the *Coppel*, and it is thither I desire my Reader to return.

Remarks.

There happens an observation in the *Calcination* of *Lead*, as well as several other things, which very well deserves some reflection. 'Tis, that although the *Sulphureous* or *Volatile* parts of *Lead* do fly away in the *Calcination*, which loss should indeed make it weigh the less, nevertheless after a long *Calcining*, 'tis found, that instead of losing, it increases in weight.

Some trying to explicate this *Phenomenon*, do say, That as long as the violence of the flame does open and divide the parts of the *Calx* of *Lead*, the *acid* of the *Wood* or other matter that burns, does insinuate into the pores of this *Calx*, where 'tis stop'd or fix'd by the *Alkali*; but this reason will not hold, when 'tis considered that this Augmentation comes to pass as well when *Lead* is *Calcined* with *Coals* as *Wood*, for *Coals* contain only a fix'd Salt that rises not at all.

'Tis better therefore to refer this effect to the disposition of the pores of *Lead* in such a manner, that part of the fire insinuating into them does there remain imbody'd, and can't get forth again, whence the weight comes to be encreased.

These igneous particles do also much rarify *Lead*; for the more it is *Calcined* and reduced into a *Calx*, it still grows larger.

If you would revive this *Calx* of *Lead* by way of *Fusion*, its parts do squeeze and expresse the igneous particles that were inclosed, and the *Lead* does thereby weigh less than it did when reduced into a *Calx*, for by this means the *Sulphureous* parts are separated and lost.

I know very well, that it will be objected, That these igneous particles being naturally light, cannot encrease the weight of *Lead* so considerably: But I suppose, that there has entred into the pores of this Metal a good quantity of them, and so it may not be hard to conceive how they may cause weight, when gathered together, tho' they be light when separated; for we see the parts of *Quick-silver*, which are evaporated by the fire, are very light, but they recover their former weight, when they are reduced.

Salt of Saturn.

THIS Operation is a *Lead* penetrated, and reduced into the form of Salt by the acidity of *Vinegar*.

*Dissolution
of Lead.*

Take three or four pounds of one of these Preparations or Calcinations of *Lead*, for example the *Cerusse*: powder it, and put it in a large Glass or earthen vessel; pour upon it distill'd *Vinegar* four fingers high, an Ebullition will follow without any sensible heat. Put it in Digestion in hot Sand for two or three days, stirring about the Matter ever now and then; then let it settle, and separate the Liquor by Inclination. Pour new distill'd *Vinegar* upon the *Cerusse* that remains in the Vessel, and proceed as before, continuing to pour

on distill'd Vinegar, and to separate it by Inclination, untill you have dissolved about half the Matter. Mix all your Impregnations together, in an earthen or glass Vessel. Evaporate in a Sand-fire with a gentle heat, about two thirds of the moisture, or 'till there rises a little skin over it. Then transfer your Vessel into a Celler or some such cool place, without jogging it; there will appear white Crystals, which you must separate, and evaporate the Liquor as before, and set it again in the Celler. Continue your Evaporations and Crystallizations, 'till you have gotten all your Salt. Dry it in the Sun, and keep it in a Glass.

Impregnation signifies dissolution.

If you would make it exceeding white, you must dissolve it in equal quantities of distill'd Vinegar, and common water, then filter it, and Crystallize it, as I said before. This Purification may be repeated three or four times.

Purification of the Salt of Saturn.

It is commonly used in *Pomatus*, for Tettars and Inflammations; the Impregnation of *Saturn* is also used chiefly for Diseases of the skin; when it is mixed with a great deal of Water, it makes a Milk that is called *Virgins Milk*.

Vertue.

Virgins Milk.

The *Salt of Saturn* taken inwardly is esteemed very good for the Quinsie, to stop the flowing of the *Menses* and Hemorrhoids, and for the Bloody Flux. The Dose is from two grains to four in Knot-grass, or Plantane water, or mixt in Gargles.

Dose.

Remarks.

I do commonly use *Cernisse* for preparing the *Salt of Saturn*, because I find it to be more open, and easier to dissolve, than the other Preparations

of *Lead*, by reason of the *Vinegar* it is already impregnated with.

The *Ebullition*, that is observed, doth proceed from the violent entrance of the *acids*, which do forcibly separate the parts of the Matter. But it is remarkable that the *Effervescency* which happens upon pouring a like quantity of *acids* on any other preparation of *Lead*, is a great deal stronger; because when the *acid* meets with a body not so open as *Cerusse*, it must use greater endeavour to enter into it, and consequently raises up the Matter higher.

In these *Effervescencies*, as well as many others, no degree of heat can be perceived by applying the hand to it, but if we put into the liquor, while it ferments, a *Thermometer*, the Spirit of *Wine* in it will be seen to rise some degrees, which is a certain sign of heat. *Vinegar* loses all its force in the penetration of *Lead*, and acquires a kind of sweet or sugar'd taste.

You must not imagine that a true *Salt of Lead* can be drawn. It is nothing but a dissolution of its substance by *acids*, which do very closely unite with it, to form a kind of Salt. For if by distillation you should draw off the humidity of the Dissolution, you'd find it to be nothing but an insipid water, and consequently deprived of all its *acids*. I shall prove that better hereafter, when we come to revive our Salt into *Lead*.

Sugar of Saturn.

This *Salt* called *Sugar* by reason of its sweetness is good for many diseases that are caused by *acid* or sharp humors, because it allwages them, and mitigates their keenness. This is particularly observed in *Quinsies*, whose cause doth ordinarily proceed from a saline or acid serosity, which falling too abundantly on the *Muscles* of the *Larynx* raises

raises a fermentation that dilates their *fibres*, and causes the Inflammation we see. Thus whatsoever is able to dull the edge of Acids is good for the cure of this Disease.

Menstrual Purgations, Flux of the Hemorrhoids and Dysenteries are usually caused by sharp corrosive Salts which fall into the Vessels. Wherefore the *Salt of Saturn*, as all other matters that absorb Acids, do serve to cure these distempers; for take away the cause of a disease, and the effect will soon cease.

The sweetness of *Salt of Saturn* cannot be better explicated than by the Sulphureous or softish substance of the particles of *Lead*, which being actuated by the *Salt of Vinegar*, do delightfully tickle the Nerve of the tongue, when it is tasted.

Vinegar impregnated with some preparation of *Lead*, is called *Vinegar of Saturn*. If it be well tempered with Oil of Roses, or some other Oil, beating them together in a mortar, it makes an unguent that is called *Nutritum*, or otherwise *Butter of Saturn*; it is good for Tettars, and other disfigurations of the skin.

Magistery of Saturn.

THis Operation is a *Lead* dissolved and precipitated.

Dissolve two or three ounces of the *Salt of Saturn* well purified, as I said before, in a sufficient quantity of Water, and distill'd Vinegar, filter the dissolution, and pour upon it drop by drop the Oil of Tartar made *per Deliquium*, it will first turn into a Milk, then a kind of *Coagulum* that

K 3

will

will precipitate to the bottom of the Vessel in a white Powder. Boil it a little, and pour it into a Tunnel lined with a Coffin of brown Paper, the Liquor will pass through as clear as Water, and the Powder remain in it: Wash it several times use. with Water to carry off all the impression of Vinegar. Then dry it, and you'll have a very white *Magistery*, that is used for a *Fucus* or *Saine*, like the *Bismuth*. It is likewise mixed in *Pomazums* for Tettars, &c.

Remarks.

Virgins
Milk.

When good store of Water is poured upon the Impregnation of *Saturn*, it turns white like Milk, and is commonly called, *Virgins Milk*; it is used in Inflammations, and to Pimples in the face: if you let this Milk settle, it becomes as clear as Water, and a White powder sinks down to the bottom; this Powder does proceed from the particles of *Lead* which were held up by the acidity of the Vinegar, and were made let go their hold, by the access of Water diluting the acid. This *Magistery* being well washt may serve like the other that I now described; but because Water alone has not strength enough to destroy the acid so, as to make it quit every particle that it held dissolved, some part of the *Lead* still remains indiscernable in the liquor, and does not precipitate. Wherefore it is better to follow my description, in the making *Magistery of Saturn*. You must use an equal quantity of Water and Vinegar to dissolve the *Salt of Saturn*, for if you should use Water alone, it would rather cause a precipitation than dissolution.

The

The Oil of Tartar, or rather the Salt of Tartar dissolved being an Alkali destroys the edges of the Vinegar that suspended the *Lead*, whence it comes to precipitate; for finding nothing in the Liquor that is able to hold it up, it falls down by its own weight.

Now in this Operation there happens no effervescency at all, because the edges of the Vinegar being broken, the fragments of them which remain have not activity, and are not keen enough to enter into the pores of *Salt of Tartar* with a sufficient penetration. And it is the same thing with all other precipitations of matters which have been dissolved by Vinegar: but when the solution has been performed with stronger acids, the precipitations are made with ebullition, for the reasons that I gave in my Remarks upon *Aurum Fulminans*.

This Powder being washed and dried is nothing but a *Cerusse* rendered exceeding fine. It is used for Paint, but this *Cosmetick* as well as all others that are made of Metallick substances, such as *Tin* and *Bismuth*, do often black the skin after having whitened it, because the heat of the flesh doth gather together these Metallick Particles, which owed all their whiteness to an exact Alkholification, and losing that, do often revive.

Some pretend to make the *Magistery of Saturn*, by dissolving the Plates of *Lead* in *Aqua-fortis*, and pouring upon the Dissolution salt water, and then to filtrate it: but certainly they have not considered, that *Lead* does not dissolve in *Aqua-fortis*, in so short time as they leave it, and so the Operation is impossible.

The Magistery of Saturn falsly described by a Modern Author.

Aqua-fortis does eat away some part of the *Calx* of *Lead* very slowly, but it also leaves so much of it, that it cannot be dissolved.

Balsam or Oil of Saturn.

THe *Balsam of Saturn* is a solution of *Salt of Saturn* made in *Oil of Turpentine*.

Put eight ounces of *Salt of Saturn* powdered into a *Matrafs*, and pove upon it *Spirit of Turpentine*, four fingers about it, place the *Matrafs* in a small *Sand* heat digested for a day, you'll have a red *Tincture*; decant the *Liquor*, and pour more *Spirit of Turpentine* on the *Matter* that remains in the bottom of the *Matrafs*, leave it in digestion as before, then separate again the *Liquor* which remains still a little coloured, and there will remain at the bottom nothing but a little *Matter*, that you may *Revive* into *Lead* in a *Crucible* by fire. Pour your dissolutions into a *Glass-Retort*, place it in *Sand*, and fitting to it a *Receiver*, distil over a gentle fire about two thirds of the *Liquor*, which will be *Spirit of Turpentine*: quench the fire, and when the *Retort* is cold pour that which is in it into a *Viol*, and keep it for use. This is the *Balsam of Saturn*, excellent for cleansing and cicatrizing of *Ulcers*. You may touch *Chancres* with it, though they be never so bad, for it mightily resists putrefaction.

Remarks.

The *Spirit of Turpentine*, to speak properly, is an exalted *Oil*. It dissolves *Lead*, and easily unites

unites with it, because it is very sulphureous.

If you should still persist in putting new Spirit of Turpentine on the remaining matter, all the Salt of Saturn would at last dissolve.

Some do use to distil away all the Liquor, and keep that for Oil which comes forth last. But it is a great deal better to follow my description; for when all the Liquor is distilled, there will hardly have risen any Particle of Saturn, and therefore it cannot be so good.

Burning Spirit of Saturn.

Spirit of Saturn is an inflammable Liquor which is drawn from Salt of Saturn.

Fill two thirds of an earthen Retort, or a glass one luted, with Salt of Saturn; place it in a Furnace over a very gentle fire, both for gently heating the Retort, and driving out a Phlegmatick Water; continue this degree of fire, until the drops begin to have some taste, then fit to the Retort a large Recipient, lute well the junctures, and encrease the fire by degrees, a Spirit will come forth that will fill the Recipient with Clouds. When nothing more will come, let the Vessels cool, and having unluted them, pour what you find in the Recipient into a Glass-Cucurbite, and rectifie in a very gentle Sand-fire about half the Liquor, which will be the inflammable Spirit of Saturn, burning like Spirit of Wine, and of a lowre taste.

This Spirit is very good to resist putrefaction of humours: It is also given in the Hypochondriack Melancholy from eight unto sixteen drops

Dose.
iii

in Broth, or some Liquor peculiar to the Disease, and the use of it is continued every Morning for a Fortnight.

Oil of Saturn.

The other moiety of the liquor that remains in the Alembick, is called improperly *Oil of Saturn*; it is good to cleanse the eyes of horses.

Revivification of the Salt of Saturn.

If you take out the blackish matter that remains in the Retort, and put it in a Crucible upon burning Coals, it will re-assume the form of Lead.

Remarks.

You must remember not to fill above two thirds of the Retort with the Salt, and to joyn a Receiver large enough, because these Volatile Spirits flying out with violence might be apt to break the Vessels, if they had not room to play in.

Weight.

If you use six ounces of *Salt of Saturn* in your *Distillation*, you'll draw an Ounce and six drachms of liquor, and there will remain in the Retort six ounces and six drachms of a blackish and yellow matter; and if you put this matter into a *Crucible*, setting it in the fire, 'twill melt, and you'll regain four ounces of *Lead*, and half an ounce, or it may be six drachms of a yellow earth coloured like *Litharge of Gold*.

How much acid requisite to make the Salt.

It is evident from this Operation that an ounce and six drachms of the more Acid parts of *Vinegar* are sufficient to impregnate four ounces and two drachms of *Lead*, to reduce it into *Salt*; but the strangest thing that happens to it, is the great change that *acids* do give it, insomuch that it is not to be known again in the least.

The

The *Augmentation* that the *Lead* in the Retort ^{Strange} does here receive, is as evident as may be; for six ^{Augmenta-} drachms are taken out of it at last, more than ^{tion.} were put in of *Salt of Saturn*, besides an ounce and six drachms of liquor that were drawn out. So that we must necessarily conclude, that the four ounces and two drachms of *Lead* are encreased two ounces and an half.

It is probable enough that the more rarified the *Lead* becomes, the more capable it will be of igneous particles; for although the *Salt of Saturn* is not suffer'd to remain long in the fire, yet the *Lead* encreases apace. Possibly it may be, that as fast as the *acids* go out of it, igneous bodies enter in their place, and open likewise the pores of *Lead* by their nimble motion; but these Pores must needs be so disposed as to shut again like *Valvules*, and hinder the return back of those fiery parts.

When this *Calx* is Calcined in an open fire in a *Crucible*, without stirring it, the parts of *Lead* close together and expel the fiery particles, so that the *Lead* revives as it was before, and recovers its natural gravity.

The matter when shut up in the Retort would never be able to revive, let the fire be made never so strong, because the igneous particles would have no liberty to get out.

The *Yellow Earth* that's found in the *Crucible* seems to be of a Golden colour, it is a terrestrious and bituminous impurity that the *Lead* is purified from. There should be indeed but two drachms of it, because four ounces of *Lead* are recovered, wherefore the *Augmentation* must needs be from the fiery parts that remained in it as in a *Calx*.

If

If after the distillation of the *Spirit of Saturn*, you take the *Retort* from the furnace while it is hot, and break it, the matter which is within, as soon as it takes Air, will flame of it self, like Coals, and continue so for some hours; then it will fall down into a yellow or grey matter, in which there will appear some pieces of *Lead*. This Circumstance proves, that *Lead* is very sulphureous; for this fire can only come from the Sulphur of the Metal it self.

This Matter, which is so cooled in the open Air, is not so weighty as that which is cooled by degrees in the *Retort*, because the small igneous bodies scatter themselves, and perhaps carry away some little of the Sulphur of *Lead*: It is also this inflammation of the matter which revives some little of the *Lead*; for there is none found in the *Retort*, when the Air is not let into it.

Why the
Spirit of
Saturn is
inflam-
mable.

Spirit of Saturn becomes inflammable from its containing in it some Spirit of Wine, that remains still involved in the Vinegar, and was carried away with the *acids* into the Pores of *Lead*, when the *Salt of Saturn* was made; for if you quicken the fire to distil this Salt, the *acids* break in pieces, and leave the Spirit of Wine at liberty, insomuch that the *Spirit of Saturn* hath no acid taste.

The matter that remains in the *Retort* after the Operation may be easily revived into *Lead*, as being deprived of the *acids* which gave it the form of Salt.

The Salt of *Saturn* may be likewise revived into *Lead* by mixing it with an Alkali Salt melted in a Crucible with a good fire, because this last Salt destroys

destroys the *acids* that kept the *Lead* thus disguised; but you must observe that it will flame before it revives, by reason of the Spirit of Wine that I said was included in the dissolution of *Cerusse* made by Vinegar.

C H A P. VI.

Of Copper.

TH E R E are many Mines of *Copper* in *Europe*, but especially in *Sweden* and *Denmark*; it is found in Powder or Stones, much like to *Iron-Ore*, which they wash Purificati- well, to clean it from the Earth that always sticks on of Cop- to it; then they melt it over a great fire, and per. cast it into moulds, which is the ordinary *Copper*: To refine it, they melt it two or three times; for upon every Fusion, some of the gross and earthy parts are separated from it, and then it is called *Rose-Copper*. Rose-Cop-
per.

Copper is a Metal that abounds in Vitriol and Sulphur: it is called *Venus*, because this Planet Venus, was thought to govern it particularly, and bestow its Influences upon it: and for this reason there hath been attributed unto it the virtue of encreasing seed, and curing the diseases of those parts that serve for Generation.

But because *Copper* contains in it a *Corrosive* Corrosive. quality, I would advise nobody to use it *inwardly*.

Copper takes Rust very easily, for if you leave Apt to rust. but a drop of Water some hours upon a piece
of

of it, it makes a *Verdegrees*. Have a care of *drinking* water, that has lain in *Copper* vessels, for it always dissolves some portion of it, which appears easily from the taste it leaves in it.

It will not be altogether amiss to make mention here of an effect that is no less strange than usual. 'Tis that *water* or any other liquor that's heated or boil'd in a *Copper* vessel for a whole day together, savours not at all, or not so much of the *Copper*, provided that it be not removed off the fire all that time, as other water warm'd in a like vessel, and put from the fire but an hour; for whereas water alone can dissolve something of the *Copper*, it would seem that being aided with the heat of fire, it should partake of its nature the more. Now in my opinion this is the most rational explication that can be given of this matter.

Every body may perceive that when the *water* begins to heat in a *Copper* vessel, that's set over the fire, little *Atoms* do rise at bottom like the stirring of a powder, and these *Atoms* do encrease according as the water receives more heat, so that at length they make it boil on high; these little *Atoms* can have no other cause than the *fiery particles*, which passing through the vessel, do drive the water upwards apace, and rarifie its parts; for this reason it is that the water is not able to dissolve any of the *Copper*, for being continually raised upwards, it can make no impression upon the bottom of the vessel.

Perhaps some will tell me, that the liquor might take the impression of the *Copper*, at the sides of the *Bason*; but it is easie to imagine that though there don't pass through the sides so many *fiery particles* as do at the bottom, there do pass

pass nevertheless enough to hinder the liquor from sticking to or dissolving any particles of the vessel.

But now on the contrary the vessel being remov'd from off the fire, and the motion of the igneous particles being quite ceased, the liquor partakes easily of the *Copper*, and so much the more easily as the fire has rarified the metal, and render'd it more proper for dissolution.

Every thing seems to confirm this Opinion, for if any liquor is put to boil over a strong fire in a *Copper* vessel, it will not impregnate in the least, but if you place it upon a small fire, and leave it so for some time, then because there will not pass fiery particles enough, to cover all the surface of the vessel, and raise up the liquor, it will take some taste of the *Copper*; but this taste will not be so strong as if you had left it the same length of time in such a vessel off the fire, after it had been warm'd.

Liquors that are full of *Salts* do take the impression of *Copper* much more easily than those that are not. Thus *Confectioners* do observe what I have mentioned; for though they boil their *Confections* in vessels of *Copper* for a considerable time, they find them taste nothing of the *Copper*, but they know that if they should leave them but half an hour in the vessel taken off the fire, they would be tainted with a most loathsome *Copper* taste.

We may learn from this Discourse, not to use a *Copper* vessel, when we have a mind to boil or heat a liquor gently, and when we do think fit to use it, to be sure to keep a good brisk fire underneath, and not to let what we have boil'd,
cool

*Liquors not
to be cooled
in Copper
vessels.*

cool afterwards in a vessel of this nature.

Another difficulty does here offer it self on this subject, and it is to know why a *Kettle* that has been taken off the fire, is not so hot at *bottom* as at the *sides*, so that as soon as it is removed from off the fire, one may touch it at bottom without burning ones finger, which can't be done at the *sides* without present scalding.

The reason of which is, that the fiery particles tending upwards through the bottom of the *Kettle*, which is flat, in a direct line, don't make any stop in passing through, having but a little distance to conquer before they come into the liquor; but those that rise on the *sides*, finding a longer space to make upon the *Kettle*, do many of them stop in the Pores of the *Copper*.

It is not the same thing in vessels that are made in another form, whose bottom is Globular, because the fiery particles rising up in an indirect line, do find more to do to pass through it, than in a flat bottom, and so by consequence more of them do stop.

Objection.

But it is objected, that if igneous bodies do pass through the bottom of the *Kettle* without any stop, they would not be able to heat it any more when it is empty than when it is filled with water; nevertheless it is plain, that when an empty vessel is set over the fire, the bottom does heat and grow red-hot, especially if left so a good while.

Answer.

I answer to this, that when the *Kettle* which was set in a great fire is full of liquor, the fiery parts having passed through the bottom in a strait line, as I said, are in a manner absorbed by the liquor, and have no more strength or action left to reflect again upon the bottom of the vessel, and

and so to heat it; but now when it is empty, the fiery parts which pass through the bottom, finding nothing to drown them and check their motion, many of them do return back upon the bottom, and that way heat it so much as they do.

And the same reason holds why an empty *Tin* or *Leaden* vessel being set in the fire does quickly melt, but when filled with liquor they will not melt, make what fire under them you please; for the fiery parts finding nothing that is able to hinder their activity in an empty vessel, do pass to and fro through its pores often enough to melt it. But these same fiery parts finding moisture to engage them in a full vessel, they cannot return upon the bottom so as to melt it.

Copper does not melt so easily as many other matters, because it contains more terrestrious parts than those others.

Brass, or *Yellow Copper* called in Latin *Auri-Brass*, *chalcum* is a mixture of *Lapis Calaminaris* and *Copper*, and vessels that are made of it give less impression to liquors than the others.

The discovery of this Metallick substance is owing to *Alchimists*; for while they endeavoured to make *Gold*, they found out a way of giving *Copper* a colour, near to that of the king of Metals.

Calcination of Copper.

To *Calcine Copper*, is to purifie it from its more Volatile parts, by the means of common *Sulphur* and fire, in order to render it the more compact.

L

Stratific

Stratifie plates of *Copper* with powder'd Sulphur in a large Crucible, cover the Crucible with a Cover that hath a hole in the middle, to give the Vapours vent. Place your Crucible in a wind-furnace, and light a very strong fire about it, until there rise no more vapours; then draw off your Plates as they are hot, and separate them, this is the *Æs ustum* that is used in outward remedies to deterge.

Remarks.

*Stratum
super stratum.*

In the making of this stratification we begin with a bed of Sulphur, and lay over it a bed of Copper-plates, then another bed of Sulphur, and another of Plates. We continue to do so till the Crucible is quite full; but you must be sure to let the first and last bed be of Sulphur. This Calcination is thus performed, that the common Sulphur by its burning may cleanse the Copper of its superficial Sulphur; but it will be much better purified by the following Operation.

Purification of Copper.

THIS second *Purification of Copper* is to render it fair to the eye, and of a high colour. Take what quantity you please of Calcined *Copper*, as above, heat it red-hot in a Crucible placed among burning coals, and cast it red-hot into a Pot, wherein you shall have put enough Oil of Linseed to swim above it four fingers; cover the Pot presently, for otherwise the Oil would take fire, let the *Copper* steep, till the Oil
is

is grown pretty cool, separate it, and put it to heat again in the Crucible, then cast it into Oil of Linseed; continue to make it red-hot, and quench it in the Oil nine several times. You must change your Oil every third time; and you'll have a *Copper* well purified, and of its former colour. If you Calcine it once again, to consume the Oil, and powder it, you'll have a *Crocus of Copper*, that is deterfiv and good to eat the proud flesh of Wounds and Ulcers.

*Crocus of
Copper and
its Virtues.*

Vitriol of Copper or Venus.

THIS Operation is a *Copper* opened, and transformed into a *Vitriol* by Spirit of Nitre.

Dissolve two ounces of *Copper* cut into little pieces in five or six ounces of *Spirit of Nitre*, pour the dissolution into a Glass-Cucurbite, and evaporate in Sand about the fourth part of the Liquor; put that which remains into a Cellar, or some other cool place, and let it lie there five or six Hours, you'll find *Blue Crystals*, separate them, and continue to evaporate and crystallize, till you have drawn them all; dry these Crystals, and keep them in a Viol well stop'd.

*Copper;
Crystals.*

They are caustick, and are used to consume superfluous or proud flesh.

If you leave these Crystals in a Pan uncover'd, they will turn into liquor that may serve for the same use.

Remarks.

*Dissolution
of Copper.*

You must put the *Copper* into a large body, plac'd within the Chimney, and pour to it by little and little the *Spirit of Nitre*, there does presently rise a great effervescency, and a red cloud from it, which would be very mischievous to the breast, if it were not avoided. Then the vessel grows so hot that a man cannot keep his hand upon it, and the heat continues until the solution be finished, for then the liquor clears up, and becomes of a fair *blue* colour.

*Whence the
great Effervescence.*

The great effervescency that happens, does proceed from the sutable Pores of *Copper* to the edges of *Spirit of Nitre*, so that they can make their entrance and jostles with a good force; for when these edges, which did before swim with all liberty in a liquid, do find their motion checkt in the body of the Metal, they do strive to disengage themselves, and do thereby separate the parts of the *Copper*. It is this violent separation which causes the ebullition and heat; for the *acid* edges striking strongly against the solid parts of *Copper*, do cause a great agitation in the liquor, and by that means do excite a heat, much after the manner as when two solid bodies are beaten against one another violently, they grow so hot as even to strike fire.

*The Copper
taketh di-
verse co-
lours.*

The red cloud is derived from the *Spirit of Nitre*, which upon rarefaction does always acquire that same colour.

When the *Copper* is but half dissolv'd, it is green, but when it is all dissolv'd, it assumes a *blue* colour; if you will separate the *acids* again from the *Copper*

per dissolved, and re-unite the parts by the help of fire, it recovers its red colour.

After that the *acids* have divided the parts of *Copper* as much as they are able, they stick fast to them, and suspend them in the liquor. Some part of the liquor is evaporated, that the rest may crystallize the more easily. That which flies away in time of the solution, is the more phlegmatick part.

Vitriol of Copper is nothing but the *acids* of *Spirit of Nitre* incorporated in the *Copper*; and it is these *Spirits* that cause all the corrosion; for they are like so many little knives fastned to the Body of the *Copper*, which do tear and gnaw the flesh on which they are applied. This *Vitriol* dissolves into Liquor, because the *Copper* having large pores, the moisture doth easily insinuate into them.

Other Crystals of Venus.

THESE Crystals of Venus are the acid part of the *Vinegar* incorporated into *Copper*.

Take what quantity you please of *Verdegrees* in powder, put it into a large Matrafs, and pour upon it distilled *Vinegar* four fingers above it. Place the Matrafs in a Digestion in hot Sand, and let it lie so two or three days, stirring it ever now and then, the *Vinegar* will acquire a blue colour; separate by Inclination the liquor that swims upon the *Copper*, and pour new distilled *Vinegar* upon the matter, leave it in a Digestion for two or three days as before, decant the Liquor, and continue to put other distilled *Vinegar* on the matter, until three fourths of the *Verdegrees* or

L 3

there

thereabouts be dissolved, and there remains nothing but a terrestrious matter. Then Filtrate all these Impregnations, and evaporate two thirds of the moisture in a Glafs Body in Sand; put the Vessel into a Cellar, and leave it there without stirring it four or five days: little *Crystals* will appear, separate by Inclination the Liquor, and gather them up; consume again about the third part of the moisture, and put it a crystallizing as before; continue these Evaporations and Crystallizations, till you have got all your *Crystals*, dry them, and keep them for the following Operation.

Distilled
Verde-
greefe.
Virtue.

It is this which Painters call distilled *Verdegreefe*, because it is prepar'd with distilled Vinegar.

It is very deterfive, and is only used in external Applications; it is also used in Painting.

Remarks.

You had better use *Verdegreefe* than crude Copper in this Operation, because it is more open, and disposed for solution by the *acids* of Vinegar; for *Verdegreefe* is nothing but a Copper opened, and reduced to a rust by the fermenting Spirits of Tartar.

How to
make Ver-
degreefe.

For the making of *Verdegreefe*, Plates of Copper are *stratified* with the husks of Grapes pressed. They are left so for some time, and part of these Plates is turned into *Verdegreefe*, which is scraped off with a Knife; then these same Plates are *stratified* again with pressed Grapes, and are penetrated as before, and more *Verdegreefe* made. This *stratification* is continued until the whole is turned into *Verdegreefe*. You must observe that *Verdegreefe* is better made in *Languedoc* and *Provence* than

than other places, because in those Countries the Grapes do yield more Tartar, and consequently do abound in these fermenting Spirits, which do penetrate the Copper.

The *Crystals of Venus* are nothing but Copper dissolved, and afterwards coagulated with the *acids* of Vinegar, that incorporate with it, and form a kind of *Vitriol*.

Spirit of Venus.

THE *Spirit of Venus* is an *acid* Liquor, drawn from the *Crystals of Venus* by distillation.

Put what quantity you please of the *Crystals of Venus* prepared with distill'd Vinegar, as I shewed before, into a Glass Retort, whose third part remains empty. Place your Retort in Sand, and sitting it to a large Receiver, and Luting well the junctures, give a small Fire at first, to drive out a little insipid Phlegm; this Phlegm will be followed by a Volatile Spirit. Then augment the Fire by degrees, and the Receiver will fill with white Clouds. Towards the latter end kindle coals round about the Retort, that the last Spirits may come forth, for they are the strongest. When you see the clouds disappear, and the Recipient grow cool, put out the Fire: unlute the junctures, and pour all that which is in the Recipient into a Glass Body to distil it in Sand until it is dry. This is the rectified Spirit of *Venus*.

This Remedy is used against the Epilepsie, the *Vertig.* Palsie, the Apoplexie, and other Diseases of the Head. Seven or eight drops of it are given in *Dose*.

L 4

a con-

a convenient Vehicle: many do use it to dissolve Pearl, Coral, and such like substances.

Revivification.

The Black Mass that remains in the Retort may be revived into Copper, if put in a Crucible in a Fire of *Fusion*, with a little Salt-peter, or Tartar.

Remarks.

The *acid* is drawn from the Copper by *fire* without breaking its points; for Spirit of *Venus* is considerably sharp, which happens not in other metals. The reason that may be given of it is, that Copper, which is very full of Sulphur, doth but barely touch upon the *acids* by its ramous parts. So that when these points are stirred by the violence of *fire*, they come forth whole, because they do not meet with resistance of a body hard enough to break them in pieces. They do also draw along with them, some of the most Volatile parts of Copper, with which they are inseparably united.

This Spirit must be rectified, because the *fire* cleanseth away the impurities which entered into the *Copper*, while it lay amongst the husks of Grapes, to be turned into *Verdegrees*.

It hath been thought that this Spirit being poured upon Coral and Pearl, was able to dissolve them without losing any thing of its force; so that when you would use the same Spirit, it would corrode the matters as before. But Experience doth not confirm it; it is true the dissolvent comes from the Coral with a great deal of sharpness, but it hath lost the acidity which was the principal *Mensstruum*; and if there remains any

any sharpness, it proceeds from the Copper.

If you use a pound of Crystals of *Venus* in this *Weight*, distillation, you'll draw half a pound of liquor, and the matter which remains in the Retort will be just the same quantity.

A small quantity of the Spirit of *Venus* may be drawn, by the fire, from the *Verdegreese*, in making the Crystals of *Venus*, but it will be very Oily and impure, by reason of the impurities, which, I have said, do mix with the parts of *Copper* when the *Verdegreese* was made.

CHAP. VII.

Of Iron.

IRON is called *Mars* from the Planet of that name, whose Influence it is thought to receive; it is a very porous Metal compounded of a Vitriolick Salt, Sulphur, and Earth, ill digested together; wherefore the dissolution of its parts is very easily performed.

Iron is found in many Mines in *Europe*, in form of a Stone or *Marcasite*, which much resembles the *Loadstone*, but this last is more heavy and brittle than *Iron*. The *Loadstone* is also found in Mines of *Iron*, and may be reduced into *Iron* by a strong fire. *Iron* for its part does easily acquire the virtue of the *Loadstone*, as every body knows, so that these bodies do seem to differ only in the figure of their Pores, as has been very well observed by our modern Philosophers.

Iron-

Iron-Mines are commonly in rough and hard Rocks. What is best, is weighty, compact, and pure; it is often mixed with a white stone like to Marble: when they are dissolved together, the *Iron* is softer, and its parts are better united. This Metal is very hard to be dissolved, because it is allayed with much Earth.

Iron in the stone is melted in large Furnaces made on purpose, both to purifie it from some earth, and to bring it into the Form we desire. Having continued some time in Fusion, it Vitri-fies as it were, and much resembles an *Enamel* of several colours; and it enters indeed into the composition of ordinary *Enamels*, with *Lead*, *Tin*, *Antimony*, *Sand*, the *Saphire*, the *Stone of Perigord*, (a Province in *France*) *Gravelled ashes*, and the *ashes* of a Plant called *Kali*.

How Steel
is made.

To make *Steel*, Plates of *Iron* are stratified in a great Furnace, with Horns or Nails of Animals, under which a very violent fire is made. The Nails burn and Calcine the *Iron*; when it is red-hot, and near melting, they draw it out of the Furnace, and dip it instantly in cold water: Then it becomes *Steel*; for the parts of *Iron*, when they were near dissolving, closed together, and condensing all of a sudden, by the coldness of the water, they retain the same disposition, and so the pores of the Metal are smaller, and consequently the matter it self more compact, more solid, and more united. What confirms this, is, That, to render *Steel* more porous, there needs only to make it red-hot, and to leave it to cool by degrees. Artificers call this last Operation,

To untem-
per it.

Untempering,

The

The goodness of *Steel* consists therefore in the right tempering it; but we may add also, That the Volatile Alkali Salts, which did flow from the Nails and Horns, do penetrate the pores of *Iron*, and destroy the *acids*, which held them open. Besides, the fire carries off many of the more volatile and soluble parts of *Iron*. Whence it comes to pass, That *Steel* remains longer without rusting than *Iron*: for Rust is only a dissolution of some parts of the Metal, by the moisture of the Air, which enters into its pores. But *Steel* having its parts more solid than *Iron*, therefore, they are not so soon, or so easily affected.

*Why Steel
does not rust
as soon as
Iron.*

Steel is to be preferred before *Iron* for the making of *Utensils*; but for *Remedies*, *Iron* is the better beyond comparison. I shall give you the reasons for what I say in the following Operations.

Altho' *Mars* does contain an *acid* Vitriolick Salt, yet it ceases not the being an *Alkali*, for it ferments with *acids*, and no body needs wonder at this effect, when they consider there is more Earth than Salt in this Metal, and this Earth containing this Salt within it, retains Pores sufficient to receive the points of *acids* when thrown upon it, and so does the office of an *Alkali*; for as I have said, speaking of the Principles, it is sufficient for a body to be called an *Alkali*, if it has its Pores so disposed as that the *acids* may be able through their motion violently to separate whatsoever stands in their way.

*Iron an
Alkali.*

Mars is almost always *Astringent* by *Stool*, by *Iron astringent* reason of its Terrestrious parts, and *Aperitive* *gent and* by *Urine*, not only by reason of its piercing Salt, *aperitive.* but also because when the body is bound, the humidities

midities do more easily filter by way of *Urine*.
Iron-water. Water, in which pieces of red-hot *Iron* have been often quenched, is good to stop a *Flux*, which effect is caused by the *Vitriolick Salt* of *Iron*, dissolved in it. The Water also of a *Smith's* forge, and other Mineral Waters which taste of *Iron*, have their vertue from the same kind of Salt, which was brought off by these Waters as they passed through the Mines of this Metal.

Opening Saffron of Mars.

THIS Preparation is only a Rust of *Iron* contracted in the Dew.

Wash well several *Iron Plates*, and expose them to the Dew for a good while, they will rust, and you must gather up this rust. Set the same *Plates* again to receive the Dew, and gather the rust as before. Continue to do so till you have gotten enough.

Virtue. This Rust is really better than all the Preparations of *Iron* that are called *Crocus*. It is excellent for Obstructions of the Liver, Pancreas, Spleen, and Mesentery.

It is used very successfully, for the Green-Sickness, stopping of the Terms, Dropsies, and other Diseases that proceed from Oppilations. The Dose is from two Grains unto two Scruples in Lozenges or Pills. Many do give *Mars* with Purgatives, which is a good practice.

Remarks.

Remarks.

The Chymists have called Calcin'd Steel *Crocus*, *Crocus*. by reason of its red colour; and they have given this name to many other Preparations for the same reason.

Though *Steel* hath been always used in the Chy- Iron pre-
mical Preparations that are used in Physick, and ferable to
is preferred before *Iron* for the Cure of Diseases; *Steel*.
it is certain nevertheless that *Iron* is fitter for that
intent than *Steel*, because it is more Soluble; for
if the action of *Iron* proceeds from nothing but its
Salt, (as there is no reason to doubt,) the Salt
of *Iron* must be much more easily separated in the
stomach, than that of *Steel*, because as I have shewn
before, the Pores of *Steel* are more close than those
of *Iron*, and therefore this must have quicker ef-
fects; besides that *Steel* being harder to be dis-
solved doth sometimes pass away with the excre-
ments, without bestowing any impression on the
Chyle. The reason that hath induced People to
believe that *Steel* is better for use than *Iron*, was
its being thought to be deprived of many impuri-
ties by Calcination, but that which is called im-
purity is the more open part of the *Iron*, and
consequently the more wholesome.

This Preparation of the *Saffron of Mars* is out
of the common road, and longer a doing than the
others; but it is the best of all that ever were in-
vented. The Dew is impregnated with a Dis-
solvent that opens very much the Pores of *Iron*,
and incorporating with it renders it more active
and soluble than it was before.

Iron

*How Iron
acts upon
the body.*

Iron doth open Obstructions by its Salt, which being assisted with the solid parts of the Metal, penetrates further than other Salts. But you must always purge and moisten the Person you give it to with broths before you presume to give it, because if it should find the passages of the small Vessels filled and obstructed with gross matters, it stops and sometimes causes Inflammations that create pains like to those of the Colick.

Many do use the filings of *Steel* without any Preparation at all.

Iron doth frequently open Obstructions by absorbing, as an Alkali, the Acid that fomented them.

Seeing that some persons have endeavoured to contradict the *Remarks* I have made upon the Effects of *Mars*, and particularly concerning the preference I have given *Iron* to *Steel* for Physical uses, I have thought it not convenient to end this Chapter, before I have laid down and Answered their Objections.

*Objection
first.*

First then they say, That because the different substances of *Mars* cannot be separated, as those of *Animals* and *Vegetables* can, it is in vain that an *Aperitive* vertue is attributed to its Salt.

Answer.

Answer, grant, all the substances of *Mars* can't be separated so easily as those of *Animals* and *Vegetables*; but because we find Salts to be *Aperitive*, and commonly Remedies that are so, are full of Salts, and that water in which *rust* of *Iron* has steeped for some time, is proper to open by way of *Urine*, it seems to me rational enough to attribute this effect of *Mars* principally to its Salt; for if the water has carried off any taste or penetrating quality from *Iron*, there's nothing at all in

in *Mars* that is able to contribute such a vertue to it, besides the *Salt* therein dissolved.

Secondly, They say, the Earth and Salt of *Mars* ^{Objection} being united and in a manner become inseparable, ^{second.} cannot act but by consent of both, and receive together joynly the good or bad impressions, that may happen to them.

I *Answer*, There is no reason to think the Salt of *Mars* absolutely inseparable from the Earth, for the water in which this Metal has steeped or boiled after Filtration does contain a *Vitriolick* taste, and *Aperitive* quality. Now it is the effect of Salt to dissolve imperceptibly in water and drive by *Urine*, as I have said; but if any body would take the pains to steep and boil gently the *rust* of *Iron* a good while in water, then Filter it, and Evaporate the liquor over a small fire to a *Pellicle*, he'll by Crystallization or by an entire Evaporation of the humidity, gain a small quantity of Salt; and it is probable enough that there was much more in the water, as may be collected from the strong taste it had of *Mars*, but it being something of a Volatile nature, it fum'd away in the Evaporation. I do not say nevertheless, that the close connexion of Earth with the Salt of *Mars* is altogether unuseful for this effect; on the contrary, I do conceive that this Earth rendring the Salt more heavy than otherwise it would be, does help to drive it forwards, and causes the *Mars* sometimes to penetrate as much by its gravity as by its Salt; but we must attribute the principal vertue to the Vehicle which is Salt, since without that, the Earth would be a dead matter, and would have no more action than other Earths bereaved of their Salts.

Thirdly,

Objection
third.

Thirdly, They say that in all probability *Mars* does act only according to the preparations which the different juices it meets with in the stomach do make; for these acid juices not falling to encounter with, and to dissolve it, there results from this dissolution a liberty to the parts of the body on which these juices did act, and consequently their restauration a-new.

Answer.

I am willing to believe that sometimes *Mars* may act in the body like an *Alkali*, by absorbing and sweetning the *acid* humour which it meets with, as it does absorb and sweeten the *acid* liquors which are poured upon it; but it must not be concluded from hence, that its *Aperitive* faculty does always consist in this effect, because as I before hinted, the water in which *Mars* has been put to boil, is *Aperitive*, and yet there is no *Alkali* in it to sweeten the *acids* of the body, when it is drunk.

Objection
fourth.

Fourthly, They object, that we must not think the hardness of the parts of *Steel* above *Iron*, whose Pores are more open, does render it less proper for all sorts of Preparations, seeing *Spirit of Vitriol*, and many other *acids* are found to dissolve with the same ease both *Iron* and *Steel*.

Answer.

I Answer, That if *Corrosive Spirits* do dissolve *Steel*, they can dissolve *Iron* more easily; and whereas a smaller quantity of them can operate upon *Iron* and *Steel*, a better effect does thence follow.

Objection
fifth.

Fifthly, 'Tis objected, That the solidity of *Steels* may be an advantageous circumstance to it, for the better fixing the dissolving Juices that are in the stomach, and that for Metals the pure are to be chosen before those that are not so.

I An-

I Answer, that instead of the solidity of *Steel*, ^{Answer.} being helpful to the stomach, it is certainly of great prejudice to it, as well as to those other parts it is distributed into; for the juices that are found in the stomach being but weak dissolvents, are not able to penetrate nor rarify this metal, if it be too hard; so that they leave it crude and indigest, heavy and troublesome to this part: Wherefore it passes away by Stool, without any good effect, as it often happens. But now if a little of this *Steel* does happen to pass along with the *Chyle*, it rather causes than takes away obstructions, for by insinuating into small vessels, it stops in the narrow passages, and causes grievous pains.

For what is said concerning the *Purity* of Metals, it is of great use to Tradesmen, for they by Purifying metals from their more rarified and *Volatile* parts, do make them the less *Porous*, and so the less liable to suffer prejudice from Air or time. Thus *Steel* is much fitter for Utensils than *Iron*, because its *Pores* are closer laid together, and it takes not *rust* so soon as *Iron*; but in *Remedies* it is not the same thing, for those Metals that are more-rarified, and are more easily dissolved in the Body, are such as we find best effects from, for the reason I have given. So that what *Workmen* call *Purity*, is often but an *impurity* in *Remedies*.

Sixthly, They say that if one would hope to find a distinct *Salt* in *Mars*, it would be more likely to find it in that which is *Purified*, than in the *Feces* which are separated from it, and which are indeed but the *Impurities* of *Iron*, that *Steel* is made of.

Objection
Sixth.

Answer.

I Answer there would be some reason to think that *Salt* might be more easily found in *Steel* than *Iron*, if in the making of *Steel*, *Iron* were simply *Calcined*, without adding *Nails* and *Horns of Animals* in the *Calcination*; for then it might be said that the *Sulphur of Iron* being in part evaporated, its *salt* would be the more *soluble*: but we must consider that the *Volatile salts* which come from these parts of *Animals*, being piercing *Alkalis*, do destroy the *acid salts* of *Iron*, and do thereby render the *Steel* more compact, and unfit to take *rust*, because the salts which by their motion did rarify the *metal*, are fixed, and as it were *mortified*, and have not the capacity of acting as they did. This is the reason why a plate of *Steel* that has infused in *Water* will not give so great Impression to it, as a plate of *Iron* *Calcined*, of the same weight, infusing the same time, will do.

Another thing remarkable in the *Calcination* of *Iron* to turn it into *Steel*, is, that it is thereby deprived of its more *Volatile salt*, which should have most effect with it, in hopes to free it from *Impurities*, and that which is called the *Scories*, is the better part of *Iron* that has been rarified by its *salt*. Thus for the same reason that some are pleased to call the *rust of Iron* its dross, the whole metal may deserve the same appellation, all of it being capable of *rusting*, if it be but laid in the open air.

Another *Aperitive* *Saffron of Mars*.

THIS Preparation is the filings of *Iron* turned into *rust* in the Rain.

Put

Put the *filings* of *Iron* into an earthen Pot unglazed, and expose it to the Rain until it turns into a Paste. Then set it a drying in the shade, and it will rust; powder it, and expose it to the Rain again as before, and so let it *rust*; continue to rehumectate, and rust this matter for twelve several times. Then powdering it very fine, keep it for use. You may wet it with the water of Honey instead of Rain.

This *Groen* hath the same virtues as the other, and is given in the same Dose. I cannot but prefer that which I described before, because I conceive it to be more open than this.

Remarks.

To clean the *filings* of *Iron* from the filth, which Tradesmen may have inadvertently mixed with it, they must be often washed in water, for then the filth swims above, and may be easily separated. Afterwards the washed filings must be dried in the Sun; but instead of filings, you may use the *rust* of common *Iron*. *How to clean the filings.*

Rain and *Dew* are impregnated with the *Spirit* of *Rain* and the *Air*, which makes them of a penetrating nature: hence it is, that they are better for Plants than common water. *Dew* especially has much of this Universal *Spirit*, which is *Acid*, because it is condensed in the cool of the Night, and precipitated by the moisture which is in the *Air*. *Dew.*

Rain and *Dew* are Aperitive because of the *Volatile acids* which they have from the *Air*: these Aperitives are so much better than other, because they are Innocent and Natural. When we would preserve them, we distill them. *Rain* may be

M 2

drunk

Dose.

drunk as common water: and the dose of *Dew* is, from one ounce to four.

I chuse these liquors rather than others for making the *rust of Iron*, because the dissolvent should come as near as possible to the vertue of the Metal: for *rust* is nothing but an imperfect dissolution of *Iron*. It is fit to put the matter into the consistence of a paste, to make it ferment more easily: and it must be ten or twelve times moistned, that the parts of the *Iron* may be subtilized as much as can be expected, by so weak a dissolvent as *Rain-water*. The water of *honey* may be used instead of *Rain-water*, for it contains an *Acid* very like that of *Rain* and *Dew*; because the flowers, from which *honey* is gathered, are impregnated with the spirit of the Air.

The *filings of Iron* are impregnated with some small quantity of *Acid* every time they are wetted, so that when the Operation is finished, they become a Vehicle, tho' weak, yet sufficient to penetrate such places of the body as are obstructed.

If this operation be performed in an earthen vessel which is Glazed, the Varnish may happen to come off, and mix with the *filings*, which will defile it.

Another Opening Saffron of Mars.

THIS Preparation is only the *filings of Iron* Calcined with Sulphur.

Take equal quantities of the *filings of Steel*, and *Sulphur* powdered. Mix them together, and make them into a past with water; put this Paste into an earthen Pan, and leave it a fermenting
four

four or five hours, after which put the Pan over a good fire, and stir the matter with an *Iron Spatula*, it will flame, and when the Sulphur is burnt, it will appear black; but continuing a good strong fire, and stirring it about two hours, it will be of a very red colour, which declares to you the Operation is ended. Let it cool, and this *Crocus* may serve in the same Diseases as the former; the Dose is from fifteen Grains to a Drachm.

Vertue.

Dose,

Remarks.

I have thought good to deliver this Preparation for the convenience of such who need a great quantity of *Saffron of Mars*, and who have not leisure enough to make it according to the other descriptions, for it is sooner Calcined, and is of a redder colour than any that are made with fire.

A Paste is made of the mixture, to the end that the acidity of the Sulphur being diluted by Water may insensibly penetrate the *Iron*, and open it the better; and it is very easie to observe this penetration, seeing that the matter does grow so hot of it self, that a man can hardly endure his hand upon it. It is the same thing whether you make a smaller quantity, or make five and twenty or thirty pounds of this Preparation at a time, it flames, and half calcines before it is put upon the Fire, which cannot be explicated but by the violent action and friction of the acid part of the Sulphur against the solid body of this metal.

This Operation may very well help us to explicate after what manner the Sulphurs do ferment in the earth when it happens to tremble, and fires to burst forth, as does too often happen in

Cause of Earth-
quakes.

M 3

many

many Countries, and among others at Mount *Vesuvius*, and Mount *Aetna*; for these Sulphurs mixing in *Iron Mines* may penetrate the Metal, produce a heat, and at last take flame after the same manner as they do in the present Operation.

What confirms this is, That there is found in hollow places of Mount *Aetna*, where the fire has broke out, a great quantity of matter, like to that which falls from *Iron* in the forge: and it will be in vain to object, That there is no Air in the earth to fire the Sulphurs; for there are Clefts sufficient in the earth to give entrance unto Air, and to set the Sulphur into a flame. But if there were not enough, the fermentation which happens, at the meeting of *Iron* and *Brimstone*, may be able to raise the Earth in some places, and to burst it asunder: This undoubtedly is the cause of *Earthquakes*: for this subterraneous fire or Air, not having a free passage upwards, does run along, and heave up the Earth, sometimes on one side, and sometimes on another: and if it meet with any place that may be easily bursted, then the flames break forth impetuously, and with great abundance, as it falls out in many places: But if the passage be too small for letting out the flames, then there rises only a Sulphureous humidity rarified into wind, which is the Cause of the *Hurricanes*. This wind doth toss the bowels of the Earth, with such Impetuosity, that it occasions horrible Ravage. These sad effects are more felt in hot Countries than in Temperate ones, because the heat of the Sun does penetrate the earth there more forcibly, and consequently more easily excites a fermentation, by setting the *Sulphur* and *Iron* in motion.

Hurricanes

Hurricanes are ordinarily preceded by great *Earth-quakes*; they root up Trees, throw down Houses, and turn many places upside down: and both Men and Beasts would be in great danger, if care were not taken to prevent it. The common remedy is, to fall prostrate presently on the ground; for this not only hindreth the being lifted up by the Wind, but it also prevents the hot and sulphureous Air from entring the mouth or nose, which would suffocate.

When *Hurricanes* come from these places of the Earth which are under the Sea, they raise the Waters into prodigious pillars, which Mariners are very much afraid of, and with very good reason, seeing they cannot escape shipwrack who rencounter them.

These impetuous sulphureous Winds mount up to the very Clouds, and do often raise up, with them, stony and mineral matters, which mixing and uniting there by heat, produce that which is called a *Thunderbolt*. As to the *Lightning* which precedes *Thunder*, it may come from the same Wind, which is pent up between two Clouds, and so strongly pressed by them, that it breaketh forth with such violence, that it enflameth the Sulphur mixed with it, and smiteth the Air diversly, which causes that noise which we hear.

Thunder, therefore, ordinarily is produced by a sulphureous Wind, that is enflamed and blown impetuously: Therefore, the places, where it passes, smell strongly of *Sulphur*: and sometimes also this sulphureous Wind is accompanied with stones.

*Pillars of
water in
the Sea,*

*Thunder-
bolt.*

Lightning.

The crack of
Thunder.

It is further probable, That the noise which we hear is partly occasioned by the quenching of the gross and earthy parts of this enflamed Wind into the water of the Clouds: For it is very likely, that when any hot substance does fall into the Clouds, it will have the same effect as when we throw hot things into water: And seeing on this occasion, there is a prodigious quantity of the kindled and enflamed matter, and that the motion of it is very impetuous, therefore the noise must needs be incomparably great.

An Expe-
riment.

This opinion is confirmed by the following Experiment. Dissolve in a Crucible, by a violent fire, seven or eight pounds of *Sea-salt*, cast the dissolution into a large vessel half full of cold water, and you shall hear a noise like that of *Thunder*, without losing your Salt, for it remains dry at the bottom, and it is only the water which evaporates. *Salt-peter*, the *Salt of Tartar*, and many other things dissolved, or heated red-hot, excite a great noise when they are cast into water, but not so much as *Sea-salt*, because their pores are larger, and therefore the igneous particles which they contain, do not burst out with such violence. It is true, I cannot say, That this Experiment is every way a just parallel to *Thunder*, seeing there is no appearance that *Thunder* comes from the dissolution of *Sea-salt*: But I only bring this instance, to give some kind of *Idea* of the noise, that may be made by plunging into water a substance strongly heated and violently moved.

Why it
rains after
Thunder.

There is also reason to think, That the Tempest, or Flouds of *Rain*, which commonly follow *Thunder*, is raised by the fire that falls into the Cloud, and

and driveth the Wind which sustains it, thereby forcing the water to fall suddenly. However, the great and dreadful havocks and destruction, I spoke of before, have probably their Origin from the mixture of *Sulphur* in the Mines.

The great heat of many Mineral waters may likewise easily be explicated by the means of these Subterranean Fires, and how they came to receive those *Sulphurs* which we see are wont to be separated on the sides of the Bath, when the water is not disturbed.

It is because those waters do pass immediately over, or else through the midst of some of these burning earths, wherein they are heated as they pass, and do imbibe the *Sulphur*. But when they are arrived to the place of the Baths, and have there a-while settled, this *Sulphur* being a fat body cannot so intimately mix with the water, but that it will separate to the sides of the Bath.

It may be also, that some Mineral waters do owe their heat to a natural *Quick-lime* they may meet withal in their passage through the bowels of the earth; but this *Quick-lime* is only a stone calcined by the Subterranean Fires, of which I have spoken. And now to return to our Operation.

You must observe to make this Calcination rather in an earthen Pan, than Pot or Crucible, and to stir it continually with a *Spatula*, that the *Sulphur* may exhale the more easily. I have sometimes tried to do it in a Crucible, but the matter still remained black, though I persisted in calcining and stirring it for above twelve hours together.

These Calcinations are always made within the Chimney, to shun the smell of *Sulphur* when

*Crocus to
be made in
an Earthen
pan.*

it

it burns: But in this Operation the Vapour of *Sulphur* does not give much trouble, because the great part of its *acid Salt*, which is the cause that it is so offensive, is shut up, and fixed in the particles of *Iron*. Hence also it comes to pass that the flame, which ariseth out of this matter, is whiter, or at least less blue, than what ariseth from unmixed *Sulphur*: for the bluish colour of the flame of *Sulphur* is caused by *acid Salts*, which grasp and weigh down the sulphureous part of a mixt body, and does hinder it to rise, as I have said elsewhere.

Weight.

If you have used a pound of *Mars*, you'll get at least a pound and four ounces of *Crocus*, which proves the *acids* of *Sulphur*, or some igneous bodies to incorporate in the pores of the *Iron*, and augment its weight.

Whence the Red colour.

The red colour proceeds from Vitriol that *Mars* is full off, which being calcined grows red like *Colcothar*.

Many other Preparations of *Opening Saffron of Mars* have been invented, but these three are sufficient as being the best.

Binding Saffron of Mars.

THIS Preparation is the filings of *Iron* deprived of their more Saline part.

Take what quantity you please of the last *Aperitive Saffron of Mars*; wash it five or six times with strong Vinegar, leaving it to steep an hour at a time, then calcine it in a Pot, or upon a Tile in a great Fire five or six hours; after that let it cool, and keep it for use.

It

It stops the *Diarrhœa*, a spitting of blood, the *Venus*. immoderate flowing of the Hemorrhoids and Terms; the Dose is from fifteen grains to a Dose. drachm in Lozenges, or else in Pills.

Remarks.

Because *Mars* is an impure *Vitriol*, the more it is Calcined, the more astringent it is. But seeing that which renders it aperitive is its Salt, or more soluble part, I intend by washing it several times with Vinegar to deprive it of much of its Salt. Afterwards I Calcine the matter to carry off by Fire what aperitive parts might remain.

Not that I expect by this means to separate entirely all that is aperitive in *Mars* from that which is astringent; that is a thing in a manner impossible, by reason of the strict union of its Salt and earth in the Mine; but I do believe it very probable to say, that if there be any thing astringent in this Metal, as it cannot be denied, it must needs be the more terrestrious part.

I may likewise say, that if the astringent *Mars* has sometimes the effect of opening, it is by the remaining Salt that it opens; but when this Salt has done acting, the terrestrious part never fails to bind.

Lastly, I further say, that I do not believe any Preparation of *Mars* to be absolutely astringent, and that all we can do is to render it less incisive, and less penetrating than before, by depriving it of some part of its Salts.

Several other Preparations for making the *Astringent Saffron of Mars* are taught, but this one may suffice.

There

Another
saffron of
astringent
Mars made
by accident.

There is found about the *Iron-bars*, which sustain the *Retorts*, in the Reverberatory Furnace, after long distillations, a powder of *Iron*, Red or Brown, which is very small: It is some part of the *Iron-bars*, which the violent fire has penetrated and Calcined. Sweep it together with a Hare's foot, wash it several times with boiling water, and then dry it. It is a very good *saffron of Mars* astringent, and may be used on occasions as the former.

Salt, or Vitriol of Mars.

THIS Preparation is an *Iron* opened, and reduced into the form of *Salt* by an *acid liquor*.

Take a clean Frying-pan, and pour into it an equal weight of *Spirit of Wine*, and *Oil of Vitriol*; set it for some time in the Sun, and then in the shade without stirring it; you'll find all the liquor incorporated with the *Mars*, and turned into a *Salt*, that you must dry, and then separate from the Pan, and keep in a *Viol* well stop'd.

Virtue.

Dose.

It is an admirable remedy for all Diseases that proceed from Obstructions: the Dose is from four to twelve grains, in Broth, or some appropriate liquor.

Remarks.

A Frying-pan is more proper for this Operation than another vessel less flat, because the liquor spreads it self about, and incorporates the better; you must use a Pan that is new.

If

If you use two ounces of *Spirit of Wine*, and the same quantity of *Oil of Vitriol*, in a small Frying-pan, you'll obtain five ounces of *Mars*.

The *Oil of Vitriol* is improperly called *Oil*, being nothing but the more caustick Spirit, as I shall prove in its proper place.

The *Spirit of Wine* serves here to moderate the too great force of the *Oil of Vitriol*, which if alone would indeed in a little time penetrate all the parts of the *Iron*, and cause a very impure Salt; but the *Spirit of Wine* hinders its so quick dissolution; so that nothing but the more soluble part incorporates with the *Oil*, to make a Salt or *Vitriol*.

You may put your liquor a thumbs height in the Pan, and leave it there a day and a half, or two days without stirring it.

The Salt is commonly made in this interval, and it coagulates sooner in Summer than in Winter; because that the heat of the Air forwards the entry of the Spirits into the pores of the *Iron*. If the *Spirit of Vitriol* be very strong, the Operation is sooner performed; but I have also observed, That there are some kinds of *Iron* sooner opened than others; so that this Operation is not alike quick in all Frying-pans. Sometimes the liquor in Winter takes fifteen days and more to turn into Salt, but one must not be impatient; for it never fails to coagulate sooner or later.

Riverius in his *Practice* gives a way of preparing the Salt of *Mars* like unto this; excepting that he puts more *Spirit of Wine* than *Oil of Vitriol*, but it is better to put equal parts, as I have done.

Its

Its vertue is greater than that of the *Crocus*, because it is whetted by the *Oil of Vitriol*, and therefore is given in a less dose; you must observe that sometimes it causes a nausea, as all *Vitriols* do.

If you put this Salt, or *Vitriol of Mars*, to dissolve in a cold place, you'll have a liquor that is called improperly, *Oil of Mars*.

Another Vitriol of Mars.

THIS *Vitriol of Mars* is an *Iron* dissolved, and reduced into the form of Salt by Spirit of *Vitriol*.

Put eight ounces of clean filings of *Iron* into a large Matrafs, and pour upon it two pounds of common water heated a little; add unto it a pound of good *Spirit of Vitriol*, stir it, and set your Matrafs in hot Sand, leave it in Digestion four and twenty hours, during which time the purest part of the *Iron* will dissolve; separate the liquor by Inclination, and sling away the earthy part that remains in a small quantity at the bottom. Filtrate this Liquor, and evaporate it in a Glass-Cucurbite unto a skin in a Sand-fire, then set your vessel in a cool place, and you'll find green Crystals, which you may take out after having gently poured off the Liquor. Then evaporate again this Liquor unto a skin, and Crystallize it as before, repeat these evaporations and Crystallizations until you have got all your Crystals; then dry them, and keep them in a Glass bottle well stoppt.

Crystals of
Mars.

This

This *Vitriol of Mars* hath the same vertues as *Vertue.*
the former, and must be given in the same Dose.

Remarks.

The *Spirit of Vitriol* is weakned by the water, to the end that it may be incapable of dissolving but only the purer part of *Mars*. Moreover if it were used alone, it would incorporate with the very substance of *Mars*, but would not be able to dissolve any of it, because there would be wanting sufficient moisture to separate its parts.

During the dissolution the liquor heats and boils considerably, because the acidity of *Spirit of Vitriol* doth violently enter the body of this metal, and makes a separation of its parts.

To Evaporate unto a *Pellicle*, doth signifie to consume the Liquor until a kind of thin skin is perceived to swim upon it, which always happens when some part of the moisture being evaporated, there remains but little more than is necessary to hold the Salt in *Fusion*.

What is meant by Evaporating into a Pellicle.

An Acid Spirit may be drawn from this *Vitriol of Mars* by distilling it in a Retort in a *Re-* verberatory fire, like common *Vitriol*; this Spirit hath been thought to have the same vertues as ordinary *Spirit of Vitriol*, but it can't be near so good, because it hath much blunted or broken some part of its edges against the body of *Mars*, in the dissolution and distillation. That which remains in the Retort after distillation, is that part of *Mars* which the *Spirit of Vitriol* had dissolved. It may be used like an aperitive *Crochus Martis*.

The Spirit of Vitriol of Mars.

Those

Those who do attribute the aperitive effect of *Mars* only to its sweetning (as an Alkali) the acid juices which do too plentifully abound in mens bodies, will find it hard to explicate how these two last preparations do come to be esteemed the best aperitives which are made upon *Mars*, for the acid does so far predominate in their composition, that the Alkali is able to do little or nothing.

Tincture of Mars with Tartar.

THis Preparation is a dissolution of *Iron* performed by the acid of *Tartar*.

Take Twelve ounces of the *Rust of Iron*, and Two pounds of *White Tartar of Montpellier*, powder and mix them together; then boil them in a great *Iron* pot or Cauldron with Twelve or Fifteen pints of Rain-water for Twelve hours time, stir the matter with an *Iron* Slice from time to time, and take care to put more boiling water into the Cauldron, according as it consumes; afterwards leave it a while to settle, and you'll have a black Liquor. Filtrate and evaporate it in an Earthen Pan over a Sand-fire, to the consistence of a Syrup, or till there rises a *Pellicle* upon it, of which there will be Two pounds and Twelve ounces.

It is a very great Aperitive, it opens the most inveterate Obstructions, and is given in Cachexies, Dropsies, Obstructions of the Terms, and other Diseases that proceed from Oppilations; the Dose is from a Drachm to half an ounce in Broth, or some appropriate Liquor.

Virtue.
Dose.

Remarks.

Remarks.

Water alone would not be able enough to penetrate the Iron, for to make a *Tincture*, though you should boil it a Month together. But when it is impregnated with *Tartar*, it dissolves it very easily. Nevertheless you must not think that this *Tincture* is a perfect solution of *Mars*; for if there were an intire solution of it, there would appear no more *Tincture* than there does in the solution of it with *Spirit of Vitriol* and water; but because the soluble part of *Tartar* which is the agent in this Operation, is only an impure acid Salt, it can but grossly rarifie the *Mars*, and after mixing with it keep it suspended in the water.

After the *Tincture* is drawn there remains a whitish matter, that you must sling away as good for nothing, it is a mixture of the grosser parts of *Tartar* and *Mars*.

This *Tincture* is called *Syrup of Mars*, by reason of a certain sweetness that is perceived in its Taste. It is reduced into the consistence of a *Syrup*, to keep the better. If it be reduced into the consistence of thick honey, it will make a very good opening *extract* of *Mars*, whose vertue and Dose is the same with what I shall describe in the following operation.

As for its virtues, it is a very great *Aperitive*, because the force of *Mars* is assisted by the *Tartar*, that serves to be its *Vehicle*.

Opening Extract of Mars.

THIS Preparation is a solution of the more open parts of *Iron*, by aperitive juices, and reduced into a solid consistence by fire.

Take Eight ounces of the *Rust of Iron* prepared in the Morning Dew, put it in an Iron pot, and pour upon it three pounds of the Water of Honey, and four pounds of Must, or the juice of White grapes perfectly ripe. Add to it four ounces of juice of Lemons; cover it with an Iron Cover, and set it in a Furnace over a little fire; leave the Matter in Digestion three days, then boil the Matter gently three or four hours, uncovering the Pot ever now and then, to stir up the bottom with an Iron slice, then cover it again, that the moisture may not evaporate too fast. When you perceive the Liquor to be black, you must take away the fire, and leave it a while to settle, pass warm through a cloth that which is clear, and evaporate the liquor in a Sand fire, in an Earthen pan, or Glass vessel to the consistence of an *Extract*. 'Tis a very good aperitive; it hath the same virtues as the *Tincture* for Obstructions of the Liver, Spleen and Mesentery; it delivers the Lymphatick vessels admirably well from what may hinder the current of *Serum*. The Dose is from Ten grains to two Scruples, in Pills, or else dissolved in some proper Liquor. That which remains in the bottom of the Iron pot is the more Earthy part of *Mars*, that is good for nothing.

Virtue

Dose.

Remarks.

Remarks.

This *Extract* doth not receive its consistence only from the *Iron*, but from the Tartareous juices of the Grapes and Lemons, with which it is mixed; its virtue is augmented by the Essential Salts, and the Spirit of Honey that leaves in it a very good impression.

The mixture is left in digestion, for the better Dissolution of the *Mars*; but seeing the *Menstruum* is not very sharp or corrosive, it dissolves only the more *Saline* and soluble parts. This Description is not common, but may be preferred before many others.

Every body grants that *Mars* is as excellent a Remedy as any in all Physick, for opening Obstructions, and restoring a good complexion to those that want it by reason of Obstructions; but you must not be contented with giving it once or twice, but for a fortnight together; some intervals may be observed, that nature may not be troubled too much. In hot climes, such as *Languedoc* and *Provence*, where are more Oppilations than in other Countries, they make no difficulty to take it sometimes every day for a month together, after a due Preparation, and it is the best Remedy that hath been known for that Distemper.

Binding Extract of Mars.

THIS Preparation is a solution of *Iron* made with an astringent Wine, and reduced into a thick consistence, by fire.

Take Eight ounces of the *Rust of Iron* powdered very fine, put it into an Iron pot, and pour upon it four pints of a strong Red wine; set the pot over the fire, and having covered it, make the Matter boil, stir it from time to time with an Iron slice, till two thirds of it be consumed; pass the Liquor warm through a cloth, and evaporate it to the consistence of an *Extract*. It stops the Looseness, Bloody Flux, the Flux of the Hemorrhoids and Terms; the Dose is from Ten Grains unto Two Scruples in Pills, or dissolved in some astringent Liquor.

Virtue.
Dose.

Remarks.

The strongest Red-wine is of so high a colour, that it appears to be black; with this Vintners do colour their White wines, they do make them to be either pale or red, according to the quantity of it they mix. And the Dyers do likewise use it.

This Wine becomes impregnated only with some part of the *Mars*, because the *Tartar* which it contains is capable but of dissolving the more rarified part of this metal, the rest remaining in the bottom of the pot. The astringent virtue of the Wine does much increase that of the Iron, and renders it very proper for the distempers before-mentioned.

mentioned. But you must not think that its aperitive Salt is wholly destroyed, for it still opens Obstructions, and passes by way of Urine: indeed it does not act this way so powerfully as the aperitive Extract of *Mars*, but effects of that kind are observ'd from it.

The same Remedy may be both astringent by Stool, and aperitive by Urine, because that when the body is bound, the Serosities which were wont to pass by Siege, do become diverted into the Urinary passages. On the contrary, in a *Diarrhœa*, the moist humours which would otherwise have taken their course by way of Urine, do here turn it by siege.

Mars Diaphoretick.

MARS Diaphoretick is only the particles of *Iron* impregnated with Volatile Salts.

Powder and mix together equal quantities of the *rust of Iron*, and *Sal Armoniack*, put this mixture into an Earthen Cucurbite, set it in a small Furnace, and stop up the bottom with Lute and Bricks, that the fire may not be able to pass upwards, but only through certain holes or Registers; fit to your Cucurbite a blind head, and give a gentle fire at first; augment it by degrees to heat the Cucurbite red-hot, and continue this degree of heat, until there arise no more vapours; then let the vessels cool, and taking off the head gather the sublimed *Flowers*, dissolve them in water sufficient only to dissolve them, filtrate this dissolution through a Coffin of brown paper, and pour upon it drop by drop the Oil of Tartar made

N 3

per

per Deliquium, or else the Spirit of *Sal Armoniack*, a powder will precipitate to the bottom of the vessel, decant the Liquor, and dry this *precipitate*; it causes Sweat, and is good against all diseases that proceed from a corruption of Humors; it sometimes also drives by way of Urine, according as bodies are disposed: it is excellent against the *Hypochondriack Melancholy*, and in *Quartan Agues*: the Dose is from ten to twenty grains in pills or some proper Liquor.

Remarks.

This Preparation is *Sudorifick* by reason of some particles of *Sal Armoniack* that remain in the *Precipitated Mars*; for when these Saline parts are actuated by the heat of the Body, being of a very volatile nature, they do insensibly distribute themselves rather into the Pores of all the Body, than follow the course of fixt Salts by way of Urine; whence a Sweat does come to follow, or sometimes an insensible transpiration, because it rarifies and gives vent to abundance of Humors that were not able to pass, by reason of their viscosity. Sometimes also finding the Pores too much obstructed, it is forced to become fixt, and follow the ordinary course by way of Urine, and then it opens the *Lymphatick vessels*, and evacuates several matters that were contained in them. People often find greater benefit from much Urine than Sweat, because the way of Urine is more natural and weakens less.

CHAP.

C H A P. VIII.

Of Mercury.

Quicksilver is a prodigy among Metals; for it is fluid like water, and though a very heavy body, yet it easily flies away when set over the fire.

It is probable, that the parts of this Metal are all of a round figure, for divide it how you will without adding to it, and it always keeps a globular form to every part; and if you look a little near it, when it dissolves in *Aqua fortis*, you'll observe an infinite number of little round bodies, which rise up in the liquor, like smoke.

Now the parts of *Mercury* being supposed round, it may be explicated how this metal does remain fluid, and why it Volatilizes so easily by fire, although it be so exceeding heavy, for the round figure being no ways proper for the connexion or union of parts, the little bodies which do compose the *Quicksilver*, cannot adhere together, and consequently they must roul one upon another, as we see happens to all round bodies; and this is that which causes the fluidity of this metal.

As for its Volatility, it proceeds from this, That the round parts being only contiguous, and having no proper union together, nothing hinders its parts from rising by the force of fire; for that which makes the other metals to be more fixt, than *Mercury*, and to remain in the fire without consuming wholly, is because their parts are continued,

N 4

nued, and so fastned together, that fire has no power to disunite them in order to Volatilize them.

Objection. It may be objected that the parts of *Quicksilver* being granted round, they should for the same reason be light, because the round bodies which approach one another, do leave many empty spaces between them.

Answer. But though there are such vacuities, the little balls are massive and compact, and this causes their gravity.

Objection. There's another objection, that is, The parts of *Mercury* are heavy, how come they to be volatiliz'd by fire?

Answer. I answer, That when these parts are said to be heavy, it is in comparison with other little bodies that are lighter: but you must not imagine that every part of *Mercury* should be heavy enough to resist the rapid nature of fire. But besides, these little *Mercurial* bodies, which we suppose to be compact, may have their Pores of such a texture, that the igneous parts being once gotten within them, may not be able to find a way out again, and so they and their small prisons may fly up together.

It is called *Quicksilver* from its fluidity, and *Mercury* because it changes into different shapes, like the *Celestial Mercury*, from whom it is thought to receive its Influence.

It is to be found in many places in *Europe*, as *Spain*, *Poland*, *Hungary*, and even in *France*; for a few years since there was discovered near *S. Lo* in *Normandy*, a Mine abounding in *Cinnabar*, from whence good store of *Mercury* is drawn.

Some of it is also found running in the Mines, and this is passed through a Shammy skin to puri-

fe

tie it from some Earth that it may be joyned with; but because it doth sometimes prove very difficult to separate it from the Earths with which it is in a manner incorporated, they are forced to distil it through Iron Retorts into Receivers filled with water.

Mercury or *Quicksilver* is commonly found under Mountains covered with white and soft stones, such as Chalk. The Plants which grow upon these Mountains are greener and greater than what grow elsewhere: but the Trees which are near the Mines of *Quicksilver* seldom bear either flowers or fruit, and their leaves also bud more slowly than in other places.

One mark for discovering a *Quicksilver-Mine* A mark for discovering Quicksilver-Mines. is, when in the Mornings of *April* and *May* there ariseth a thick vapour or fog, which goes but a little way into the Air, because of its weight. They apply themselves then to these places for finding this Metal, especially if they happen to be situated over against the North Wind; for then it is believed, that the Mine is very plentiful. There is also much water found about these Mines.

Natural *Cinnabar*, called *Mineral*, is a mixture Cinnabar. of *Mercury* and *Sulphur* that sublime together by the means of a Subterraneous heat, and this is done near after the same manner as Artificial *Cinnabar* is made, of which I shall speak anon.

Quicksilver by reason of its fluidity is hard to transport, wherefore a great quantity of it is reduced into *Cinnabar*, (in the places whence it is taken) after the manner following.

Artificial

Artificial Cinnabar.

Cinnabar is a mixture of *Sulphur* and *Quick-silver* sublimed together.

Take a quantity of *Sulphur*, and melt it in a great earthen pan, then mix by little and little thrice as much *Quicksilver*; you must stir about and preserve the matter in Fusion, till all the *Mercury* disappears. Then powder your mixture, and sublime it in pots in an open fire well governed, you'll have a hard Mass, and of a very red colour. If any heterogeneous Metal should have been mixt with the *Mercury*, it would remain at the bottom of the Pots.

Besides the convenience of easily transporting *Mercury* by this means, it is very useful in Painting. It is also used in *Pomatus* for the Itch, and to make Fumes withal to raise a Salivation.

Remarks.

A pound of *Sulphur* is able to incorporate three pounds of *Mercury*, and to make a Mass together.

The cause of this mutation of *Mercury* into *Cinnabar* does proceed from the penetration which the more acid part of *Sulphur* does make into the *Mercury*, and the intangling its parts whose motion is now checkt. And being raised by the fire it volatilizes as it does, but the Saline or acid Spirits of *Sulphur* do fix it, so as that it is constrained to stop its volatility, and settle in the upper part of the pot, which is called *subliming*: whereas when it is all alone, or else joyned with

with some matter that cannot fix it, it evaporates quite away.

Cinnabar is shaped like needles, by reason of the acid Spirits of *Sulphur*, which have entred into its body, and have impressed such a figure; its red colour may proceed likewise from the *Sulphur* which is of this colour when it is well rarified.

This Red appears brown white the *Cinnabar* is in the Mass, but if you powder it very fine, beating it a good while, it becomes of a shining, and that so high a colour, that it has been called *Vermillion*. Some women do rub their Cheeks with it, when they have mixt it in *Pomatum*, but they don't consider that so dangerous an accident may happen from it, as a *Salivation*.

The Fumigation with it, is made by causing a Patient to receive the Fume of the *Cinnabar* thrown into the fire.

Reviving of Cinnabar into Quicksilver.

THIS Operation is performed in order to separate the *Sulphur* which is in the *Cinnabar*.

Take a pound of Artificial *Cinnabar*, powder it, and mix it exactly with three pounds of Quicksilver also powdered; put the mixture into an earthen or glass Retort, whose third part at least remains empty. Place it in a Reverberatory Furnace, and after having fitted to it a Receiver filled with water, let it rest 24. hours at least, give your fire by degrees, and at last encrease it to the height, the *Mercury* will run drop by drop into the Receiver; continue the fire until no more will come; the Operation is commonly at an end

end in six or seven hours. Pour the Water out of the Receiver, and having washed the *Mercury* to cleanse it from some little portion of earth it might carry along with it, dry it with Linnen, or the crum of Bread, and keep it for use.

You must draw thirteen ounces and a half of flowing *Mercury* out of each pound of Artificial *Cinnabar*.

You may again revive the *Cinnabar*, by mixing it with equal parts of filings of *Iron*, and by proceeding in the Operation, as I have taught.

Remarks.

When *Mercury* is thus revived, you may be sure of its purity, because if any Metal should have mixed with it in the Mine, it would remain, as I have said, at the bottom of the Pot you sublime it in: and if the *Cinnabar* were adulterated, that which had been used in the adulteration, either would not rise with the *Mercury*, or else would separate from it in the Receiver.

Cinnabar being nothing but a mixture of acid *Spirits* and *Mercury* together, if you mix it with some *Alkali*, and drive it upwards by fire, the acids, for the reason I have already spoken of concerning the *Depart* of Silver, must leave the Bodies they were joyned to before, for to enter into the *Alkali*, and this is what happens here, for the acids finding the Quick-lime very porous, do leave the *Mercury*, and adhere to the Quick-lime; so that this *Mercury* being disengaged from what held it fixt before, and forced by the fire, comes forth of the Retort in form of Spirit, but the

How the
Revivifica-
tion is effe-
ctuated.

the coolness of the Water that is in the Recipient, condenses it, and resolves it into *Quicksilver*.

A third part of the Retort is left empty, because the rarified *Mercury* comes forth with such violence as would otherwise be apt to break the Retort.

You must leave the mixture to settle a day or two, before you put the fire under it, to the end that the Quick-lime may slake the while, for if you should not observe this circumstance, the Retort would burst. You might also use such a Quick-lime as has been already slak'd in the air, and then you might begin your distillation immediately after the mixture, but I do think that the *Revivification* will be the more exact, when unslak'd Lime is used, because the Alkaly will act more strongly upon the Sulphureous acids.

This precaution would not be needful, if instead of Lime, the filings of *Iron* were used for the *Revivification* of *Cinnabar*.

When the distillation begins, abundance of Sulphureous fume is seen to come out of the Retort; the juncture of the Receiver with the Retort must not be luted, because it is better to let this *Sulphur* fly away; for if it had no vent, we might have reason to fear lest some part of the *Quicksilver* would joyn and unite with it in the Receiver, and so we might be obliged to make a second *Revivification* of it.

If by way of curiosity you weigh the Lime ^{The weight} which remains in the Retort after distillation, ^{of Lime that} you'll find three pounds and half an ounce of it, ^{remains.} this little augmentation of weight proceeds from a remainder of the *Sulphur of Cinnabar*, and the matter does smell of *Sulphur*.

Of the difference of the Revivification of Cinnabar, with Lime and with Iron.

If you Revivifie sixteen ounces of *Cinnabar* with sixteen ounces of *Iron*, after having extracted thirteen ounces of *Mercury*, you will find remaining in the Retort nineteen ounces less by two Scruples, so that there is only evaporated two Scruples of Sulphur in this distillation: whereas there does evaporate two ounces and a half in that which is made with Lime. The reason of the difference is, That the greatest part of the Sulphur of *Cinnabar* cleaves to the filings of *Iron* which remain in the Retort when the Mercury runs into the Receiver: but the Igneous particles, which rise from the Lime, draw with them much of the Sulphur of *Cinnabar*, in the other distillation, which swims above in the water of the Receiver, but there is little or none to be seen when *Iron* is used.

Why a smaller quantity of Iron than of Lime, serves to the Revivification of Cinnabar.

A less quantity of the filings of *Iron* than of Lime will serve for the Revivification of *Cinnabar*, because the mixture and strict connexion of the parts of *Cinnabar* with the *Iron*, is more easily effected than that of *Cinnabar* and Lime; for the Pores of the Metal agreeing better with Mercury than that of Lime, it necessarily follows, that there will be a stricter union with those two, and that the Acids of the Sulphur will be better mixed with the Alkali, to forward the separation of the Mercury by fire. If any one will be at pains to Calcine the filings of *Iron*, impregnated with the Sulphur of *Cinnabar* that remains in the Retort after the distillation of Mercury, in an earthen Plate, for ten or twelve hours over a great fire, they may have a kind of Saffron of Mars aperitive, which may be useful: but yet those which I have described above are much better.

Quicksilver

Saffron of Mars aperitive.

Quicksilver is one of the greatest remedies we have in Physick, when it is used as it should be, but is full as dangerous, when it happens into the hands of *Quacks*, who use it upon all occasions for all sorts of Diseases, and give it indifferently to all sorts of persons without any respect to the Temperament they are of. Those who draw it out of Mines, or work much with it, do often fall into the *Palsie*, by reason of *Sulphurs* that continually steam from it; for these *Sulphurs* consisting of gross parts do enter through the Pores of the Body, and fixing themselves rather in the Nerves by reason of their coldness, than in the other Vessels, do stop the passage of the Spirits, and hinder their course.

How Mercury occasions the Palsie.

Mercury is given in the Disease called *Miserere*, unto two or three pounds, and is voided again by siege to the same weight; it is better to take a great deal of it than a little, because a small quantity might be apt to stop in the circumvolutions of the Guts, and if some *acid* humours should happen to joyn with it, a *Sublimate Corrosive* would be there made; but when a large quantity of it is taken, there's no need of fearing this accident, because it passes quickly through by its own weight.

Mercury good for the Miserere.

Mercury mixes so well with resinous and fat Bodies, as to remain imperceptible; all *Unguents*, *Pomatus* and *Plaisters* in which it enters, are good against the Itch, and Tettors, and do dissolve cold tumours, because it opens the Pores, and drives by perspiration. Furthermore, seeing these distempers are fomented by *acid* humours, it breaks their edge, and hinders them from causing any further Fermentation.

Mercury drives away the Itch.

Hitherto

*Most proper
for Venereal
Maladies.*

*Common
who Live
and walk*

Frictions.

*The effects
of Mercury
hard to be
explicated.*

Hitherto there is no Remedy found out to be so sovereign for the cure of Venereal Maladies, as *Mercury*; wherefore its greatest enemies have been forced to fly to it, after they had tried a long time to no purpose to drive out the poison by other Remedies. And in truth if we knew any milder ones that were able to terminate the Accidents of the Pox as well as this does, 'twould argue much rashness to make use of *Mercury*, because it is not always conducted according to our desires, and sometimes very scurvy consequences do happen upon it; but we know no other that can be esteemed to approach it in vertue for all Venereal Diseases, and especially the Universal Pox. It is killed in Turpentine, then with Suet an Ointment is made of it, that serves to rub the parts of the body, and particularly the joints with, several days together; beginning at the sole of the foot, and ending at the neck, after the Patient hath been prepared by Baths, Broths, and Purges. The Friction is continued until the *Salivation* rises, which is caused by a great many Shancres in the mouth; for these Shancres by an exceeding great acrimony do open exceedingly the salivating Vessels, and give way to a tickling Phlegm, that runs down abundantly. A Flux is also raised by applying *Mercurial Plaisters* upon all the Body, and also by *Fumigations* by making one receive the Fume of *Mercury*. Again it is raised by taking inwardly *white Precipitate*, or some other Mercurial Preparation, without using it outwardly. Let us now come to reason a little upon it.

The effect of *Mercury* hath puzzled almost all Chymical Philosophers; and those moderns who have

have explicated with much probability and likelihood many other Natural Things that lay hid to our Forefathers, have declared those of *Mercury* to be some of the most difficult. I know very well that several Persons governed by false Principles, have not forbore to give us their Explications; but when their discourses come to be examined by Chymistry, which alone is able to give us Demonstrations on this matter, they presently come to nothing. I shall here present you with a Thought of mine, that seems more probable than any thing I ever met with, and is maintained by Chymical Experiments.

You must first take notice, and it is a thing indisputable among all Physicians, that the Nodes, Tumors, and other effects of the Venereal Poison are fomented by Saline or Acid humours which make a certain Ferment, and that this disease can never be cured, until this Poison is quite destroyed. This being supposed, we must examine the nature of *Mercury*, and see what will become of it, if we mix it with Salts or Acids. I have said that *Mercury* is a Volatile, and we shall find hereafter that in the making of *Sublimate Corrosive*, *Mercury* is mixed with *Salt* and *Vitriol*, which are Acids; that upon the encreasing the fire, the Spirits adhering unto *Mercury*, which is an Alkali, do sublime along with it to the top of the Vessel, and make together that which is called *Sublimate Corrosive*; Let us now see in the cure of the Pox, how *Mercury* is used.

It is mixed, as I have said, with Suet, and with this Unguent the parts of the Body are rubbed a long time, that the *Mercury* may pierce and enter through the Pores; which it does, as every

O

Body

*Venereal
Tumors are
filled with
acid hu-
mours.*

*Quickfil-
ver enters
the pores of
the body.*

Body must grant; and this hapning, there's no contradiction at all in thinking that some part of it mixes with the Saline or Acid Ferment of the venereal matter, after the same manner, as it doth with *Salt* and *Vitriol*.

It sublimates towards the head.

The Acid Salts of the Venereal Poison fixing in the Pores of *Mercury*, which is, as I have said, a Volatile Alkali, do sublime together, being driven by the heat of the body, up to the head, which is the top of the vessel, and the coolest place, and so most proper to condense them.

The head swells.

At the same time it is that the Head swells, and the inside of the mouth is full of Shancres, which cause a pain much like unto that a man would receive, if *Sublimate Corrosive* were applied sometime upon an excoriated part. Moreover the *Salivating Vessels* being prickt and corroded with this sharp humour, do open, and let fall abundance of Phlegm, and this causes the involuntary Salivation, that uses to accompany these Shancres, and remain sometimes a longer, sometimes a less time, according as the Shancres are more or less acrimonious; for the Phlegm trickling down continually, cleanses them from their keen Salts, and mitigates the pain, whence it comes to pass that they are often cured of themselves, and then the *Salivating Vessels* closing up again, the Flux doth cease.

Salivation.

Evil consequences of Mercury.

It sometimes happens, when a man is not well prepared to receive a Flux, or that it is raised too soon; that the Sublimation being too violent, some part of the *Sublimate* sticks to some one or more of the vessels, and corroding their membrane, causes grievous Hemorrhagies, as I have seen to happen several times, and among others to

to a man in *Languedock*, who voided in half an hours time twelve pints of bloud by mouth, without dying of it notwithstanding, because he was a very stout lusty man.

As for what may still remain of the Venereal Poison, after the Salts are driven out, its dissolution is then a very easie business, because nothing but those Salts was able to hold it coagulated; so that it is easie to conceive, that the subtiler part of it may pass through the Pores, and the more terrestrious precipitate, and be evacuated by way of Urine.

Perhaps you'll object, That *Mercury* will raise a Flux in persons who never had such a disease as the Pox, and who never had any of those tumours that contain acid Salts; but it is an easie matter to answer, That there is no man whatsoever, let him be never so sound, but hath store of Saline or acid humours in his body; the *Serum* which runs into every part is full of Salt, and all the Ferments that preserve the Oeconomy of Nature, do it by nothing else but Salts or Acids; Now there is no more difficulty in comprehending that *Mercury* may joyn with the Acids of a sound Person, than those of an impure tumour: for I don't think that *Mercury* goes immediately and seeks out the Acids in the tumours of impure Persons, it must have an understanding to do that; but being rarified and moved by the heat of the body, it circulates every where, until it comes to find a Salt that is able to fix it in some measure, and hinder its motion.

Sometimes this *Mercury* not meeting with Salts enough to detain it, passes off by transpiration, and carries along those that were united to it;

O 2

whence

Mercury will raise a Salivation in persons who have not the Pox.

Some cured without a Flux.

whence it comes to pass that many have been cured of the Pox without a Flux.

Effects of Mercury by Stool.

At other times it meets with Alkali salts which force it to quit its hold of these Acids, and then it precipitates downwards, and purges by way of stool, whence it comes to pass that those who have a looseness in the time of their taking *Mercury*, are exceeding hard to receive a Flux.

Upon the same Principle may be given the reason of many other Accidents which follow the use of *Mercury*. But let us see whether any thing of use may be drawn from this Discourse for the cure of Venereal Maladies.

Although the *Poulains*, *Phymosis*, *Shancres*, *Gonorrhæas*, and other *Precursors* of the Pox, may be cured without a Flux, yet nevertheless you must not neglect the use of *Mercury*; for these Diseases do contain in them a Poison that is not at all different from that of the Pox, but only in that it hath not fermented enough to be rarified and carried by the Circulation into the Habit of the body; so that there will remain some Salts which cannot be carried away clear by any thing but *Mercury*, which when given in a small quantity on these occasions, drives only by perspiration or by stool, without a Flux. *Sweet Sublimate*, of which I shall shortly speak, is very much used in these Distempers, among other general Remedies.

How to cure the Pox.

When you undertake the cure of one in the Pox, you must bathe him a good while, purge and bleed him for Preparation of the humours, to the end that *Mercury* finding them more fluid, may be able to unite with them the more easily, and so carry them off. This *Mercury* must be administered by little and little at first, afterwards the

Dose

Dose is augmented according to the strength of the Patient, and when the Jaws begin once to ake, you must give no more, unless it be now and then for continuation of the Flux. They spit commonly three Weeks together, but if it doth not by that time stop of its own accord, you must endeavour to stop it with Deterfive Gargarisms.

It happens sometimes that the Salivating vessels dilate and open so extreamly by the Corrosive Salts which caused the Salivation, that they cannot be closed again by any kind of Gargarism, and then the Brain dries up by little and little, and Death is the consequent of all; wherefore you must have a great care of not letting the Flux run too long.

I could attribute the invention of this discourse to my self, being the first who have thus treated of this matter in *France*, and maintained it in *publick meetings*; but I am not possessed with that vanity of *Authors*, I leave it to those who love it: I had no affectation to make a *Book on purpose* concerning it, but have only mentioned it as a thing incident to the Subject I treated of. I shall only say by the by, that those who make pretence of first finding it out, have hapned to make their complaints a little too late, having *Printed* their *Book* a year after mine, and three year after I held a *Publick Discourse* of it at *Monsieur de Lannay's*, not to speak of what I taught a long time before in the first *Courses of Chymistry* that I shewed.

Some thinking to invalidate what I have here-
upon established, do say that *Mercury* cannot be
absolutely called an *alkali*, because the *alkali* that
is in *Mercury* is but one part of its Composition,
and is not to be separated from its other parts.

Objection.

Answer. To *Answer* this difficulty, you need but only read in the *Remarks* that I have made upon the *Principles*, how it is that I do explicate the nature of an *alkali*, and you'll find that although the name *alkali* comes from the *Salt* of a *Plant* called *Kali*, that is, *soapwort*, yet all bodies that cause a sudden Effervescency with *acids* are called *Alkali's*, without any need of their containing any *Alkali salt* within them. So that I have no need to enlarge this *Book* without reason, by *Answering* all the little *Objections* that have been made to me upon the supposition of *Mercury's* being a pure *Alkali*. It is likely enough that those who have rais'd them, have not read with attention what I have said in my *Remarks* upon *Mercury*. For there they might find *Solutions* enough. I shall speak nevertheless to some of the principal ones.

Objection. First, It is *Objected* that if *Mercury* be an *Alkali*, and the *Venereal* venom an *acid*, this same *acid* should certainly fix it, whereas the *Dissolutions* of it that are made by the *Juices*, do only serve to encrease its *Volatility*, and render it *Corrosive*, instead of being at all sweetned by it.

Answer. I *Answer*, it is as false to say, that *Mercury's* is *Volatilized* by the *Acid* *juices* of the *Venereal* venom, as it is that *Mercury* mixed with *Acid* *Spirits* to render it *Corrosive*, should be *Volatilized* by the same *Spirits*. On the contrary, *Mercury* alone does easily *Volatilize* by the heat of the body, and nothing but *Acids* are able to fix it at all. I thought I had sufficiently explicated my self as to this, when I said that sometimes *Mercury*, finding not in the body enough *Acid* *Spirits* to fix it, does pass by *Transpiration*, &c.

As for the *Corrosive* nature that the *Mercury* assumes, we must attribute it to the disposition of its Pores, and the abundance of Acid points it is impregnated with; and seeing it will not sweeten the Acidity of *Salt* and *Vitriol*, with which it is mixed to make *Sublimate Corrosive*, why should we expect it to sweeten the Acid juices of the body? I do not pretend nevertheless that it never dulcifies at all; for I do conceive it may destroy much of their force by dividing and breaking their points, when the Acids are but few, as does happen in *Mercurius dulcis*.

Secondly, It is objected, That if the venom of the *Pox* were an Acid, it might then be cured by the use of *Alkali Salts*, either fixt or volatile, as by *Crabs-Eyes*, *Pearl*, or *Coral*, and such like bodies as are wont to kill and sweeten Acid humours. *Objection.*

I Answer, We often find that *Volatile salts* do give some ease to those that are troubled with the *Venerical distemper*, whether it be by opening the Pores, and so making the subtler part of it perspire away, or that by being *Alkalies*, they do absorb some part of it. For this reason some do use to give their Patients the *Volatile salt of Vipers* several mornings together, but these *Alkalies* are in truth of too weak a nature to carry off such an *Acidity*, after they are impregnated with it, as *Mercury* is able to do without losing its nature. They are *Nets* of too fine a make, to catch such keen and active bodies; if these *Salts* do destroy some part of the *Acidity*, they destroy themselves likewise in the conflict, so that they can have no further operation, wherefore there's need of a more powerful *Volatile Alkali* than these *Salts* are, to eradicate the *Acidity* of the *Venerical poison*. *Answer.*

As for *Fixt Salts*, and *Alkali* bodies, as *Pearl*, *Coral*, *Crabs-eyes*, whereas they have no *Volatile* quality in them, and their tendency is wholly downwards, it is very uncertain whether ever they reach to *Venerreal tumours* (which commonly rise in the *Joints*,) by reason of the long way they have to pass thither, and the *Juices* they have to encounter with in their passage, which may in all likelihood change their nature; but suppose they were carried to those *Tumors* with the same qualifications with which they were taken, they would only serve to weaken a little this *Acidity*, without being able to carry it off, and so they would only give a little ease, without removing *Radically* the *Ferment* of the *Distemper*, as *Mercury* is able to do.

Objection. It may be further asked why *Sublimate* does not fill the substance of the *Brain* with *Ulcers*, as well as it does the *mouth*.

Answer. I Answer, That this *Sublimate* being in the *Brain*, finds it self so clog'd with a *Mucilaginous* moiſture, that it is fain to lose there some part of its *Acidity*; so that it can do nothing else but cause a *Fermentation*, which makes the *Phlegm* purge away through the *Salivating vessels*, and this it is that causes the *Spittle* of those who have a *Flux*, to be so sharp and stinking.

This sharp *Phlegm* may also as it passes in the *mouth*, encrease the number of *Ulcers*, for the *mouth* is as it were the *ſink* of the whole body upon this occasion.

Sublimate

Sublimate Corrosive.

Sublimate Corrosive is a Mercury impregnated with acids, and raised by fire to the top of the vessel.

Put a pound of Mercury revived from Cinnabar Dissolution into a Matrafs, pour upon it eighteen ounces of *Spirit of Nitre*: Set your Matrafs in Sand a little warm, and leave it there till it be all dissolved; pour your dissolution, which will be clear as water, into a glass vessel or earthen pan, and evaporate the Liquor gently in Sand, until there remains a white Mass, which you must powder in a glass mortar, and mix with a pound of *Vitriol* calcined white, and so much Salt decrepitated: put this mixture into a Matrafs, whose two thirds at least remain empty; place your Matrafs in Sand, and begin with giving a small fire, which you must continue so for three hours, then increase it with coals to a pretty good strength, there will arise a Sublimate to the top of the Matrafs; the Operation must be ended in six or seven hours, let the Matrafs cool, then break it, avoiding a kind of Farine or light powder that flies into the air when the matter is stirr'd; you'll have a pound and three ounces of very good Sublimate Corrosive, keep it for use.

The red Scories that are found at the bottom, must be flung away as useless.

This Sublimate is a powerful Escharotick, it eats proud flesh, and cleanses old Ulcers very well. If half a drachm of it be dissolved in a pound of Lime-water, it turns Yellow, and makes that which is called Phagedenick Water.

Phagedenick Water.
Remarks.

Remarks.

Why Mer-
cury dis-
solves more
easily than
other Me-
tals.

There needs not half the *Spirit of Nitre* for dissolving a pound of *Mercury*, as there does for the same weight of *Bismuth*, although the pores of this last be much the larger, and the parts more disposed for separation; the reason of which is, that the *Mercury* being *Volatile*, and very diffused in its parts, it will divide almost of it self, and is held up more easily by *Acid Spirits*, than another body can be whose parts are more united, and whose tendency is downwards, such as *Bismuth* is.

Strong ebul-
lition, and
the cause.

When the dissolution of *Mercury* is a making, there appears a great ebullition in the Matrafs accompanied with Red vapours; also the heat is so very strong, that a man cannot endure his hand upon it: all this great stir proceeds from the Acids, which meet with resistance in their penetration of this body; for jostling one against another, they heat the liquor, and cause some part of the *Spirit of Nitre* to evaporate away in red clouds, as it uses always to do when it rarifies. When the *Mercury* is all dissolved, the dissolution clears up and cools, because the edges of the Spirits are all sheathed in the *Mercury*, whence their motion comes to be interrupted and cease; and this is a thing so true, that if you should by way of curiosity distil this dissolution, you would draw off only a weak acid, for the greatest part of the edges do remain involved with the *Mercury* in a white mass.

Weight of
the white
mass.

That which proves this Remark is this, that the white mass which is drawn from the Solution of

of sixteen ounces of *Quicksilver* in eighteen ounces of *Spirit of Nitre* does weigh at least two and twenty ounces, that is to say, six ounces more than the weight of the *Quicksilver*. Now this augmentation cannot proceed from any thing else but the *acid Spirits*.

This mass is exceeding *Corrosive*, by means of the same *acid Spirits*, which become very active ^{Why it is} *Corrosive*, wherever they are met with.

If instead of *Spirit of Nitre* we should use *Aqua fortis* to dissolve the *Mercury*, the Solution would become clear like the other, but there would be this difference between them, that when we have evaporated about a fourth part of the liquor in a glass-body in Sand, the remainder would be as red as *Claret Wine*, and if we should let the liquor cool, there would appear in it white Crystals in form of long needles, and the liquor would still retain its red colour.

I conceive that the Solution acquires this colour from the Sulphurs which remain in the *Aqua fortis*, for the Sulphureous parts being in great motion may often turn and whirl about the insensible parts of *Mercury* round their centre. Now it is easie to remark by abundance of Experiments, that the red colour is a consequence of the great attenuation, or disposition to circulary motion, which the matter has received. But the Solution which is made with *Spirit of Nitre* does not become red, because there is no Sulphur in this Spirit, or else there is not enough to do it.

You might perform this Operation by only mixing crude *Mercury* with Salt and Vitriol, without taking the pains to dissolve it with *Spirit of Nitre*, but you would be an intolerable while in ^{No need of dissolving Mercury to make a sublimate.} corpo-

corporating them together, so as to make the *Quicksilver* imperceptible. Moreover there rises up a dust to the Nose that is very unwholsom: that which we aim at therefore by dissolving it, and reducing it into a white mass, is only to prepare it for an easier mixture.

Sublimation explained.

The Neck of the Matrafs must be cut, that the superfluous humidities may the sooner evaporate; for this sublimation, which I have described, is not made until there ascend, through the hole, or entrance of the Matrafs, a great quantity of red fumes. These fumes, or vapours, are only the *Spirit of Nitre*, which, with the *Vitriol* and *Salt*, do so fix and load the body of *Mercury*, that it cannot rise, so, tho' at first, this Volatile Metal be so entangled, that it cannot evaporate, yet afterwards it rises, and draws along with it the remainder Corrosive Spirits, with which it was mixed. Nevertheless, these Spirits are a kind of load to it, and do restrain its great volatility, so as to keep it from evaporating quite away, if there was nothing to withhold it; but it only sublimes to the upper part of the Vessels in fair white Crytals, which is called *sublimate Corrosive*.

Weight of the remaining mass.

The Mass that remains at the bottom of the Matrafs is nothing but a mixture of the Terrestrious parts of *Salt* and *Vitriol*. It should weigh twenty eight ounces.

Some will needs blame this preparation of *Sublimate Corrosive*, by saying, that when it is used to the making *Mercurius dulcis*, the *Spirit of Nitre* ought to be suspected by reason of its acrimony, and particularly its *Saline Sulphureous* parts.

But

But by performing this Operation, the way that I have described, there will be no need of retaining any scruple upon this account, because the *Sublimate* can't be made, without an evaporation of many red vapours through the entrance of the Matraſs, for three hours time at the least, and these vapours can be nothing else but the *Spirits of Nitre*, for so small a fire is not able to separate and raise so high the *Spirits of Salt* and *Vitriol*. Thus there is no need of fearing these *Saline Sulphureous Spirits*, with which *Spirit of Nitre* is thought to be well stored, because they being of a Volatile nature must necessarily come before the others. But supposing that *Spirit of Nitre* did still remain in the *Sublimate Corrosive*, of which we make our *Mercurius dulcis*, I see no reason why we should apprehend more hurt from their acrimony than from the other *Corrosive Spirits*, because few men scruple to give this Spirit it self inwardly, in potions for the *Colick* and other diseases, and they give divers Preparations made with this dissolvent, such as *white Precipitate*, and many *Precipitates* of Gold and Silver, without any visible harm. But that which is most remarkable, is, that even those who cry out upon this Preparation for being made with *Spirit of Nitre*, do nevertheless themselves recommend and use much a *Mercurius dulcis*, which they make by *Subliming* white *Precipitate*, that is prepared with *Spirit of Nitre*.

The *Corrosion* of *Sublimate* does proceed from ^{Whence} the edged Acids which do fix in the body of *Mer-* ^{the Corro-}
cury, and it may be said with great probability, ^{sion of Sub-}
 that this metal always retaining a round figure, ^{limate,}
 (let it be divided never so subtilly) does rarifie by
 the

the heat of fire into an abundance of little balls which the *acid* Spirits do fix into on all sides, and so interlace themselves in it, that they hinder its rising higher, and do together make one body that is called *Sublimate*. But when this *Sublimate* is applied to flesh, the heat and moisture of it do set in motion the *Mercurial* parts, and the motion of the little balls being once raised, they rowl about with great fury, and tear the flesh with the edges they contain, which are like so many little knives cutting wherever they touch; from whence it comes to pass, that if the *Sublimate* should be taken inwardly, it kills in a very little time; the humidity which does always accompany and soften our flesh, gives it a greater hold than otherwise it would have, which is the reason why *Sublimate* does act with that celerity it does upon a soft moist part rather than a dry: nay it is often wetted with a little water, to make it work the more quickly.

By this Remark may be explicated why the *Lapis infernalis*, which is a Silver filled with the edges of *Spirit of Nitre*, has not so violent an effect as *Sublimate Corrosive*; because the parts of Silver have no such aptitude to rowl to and fro, and to rise, as those of *Mercury* have; for which reason it is likewise, that it does not make so great an *Eschar* as the *Sublimate*, although it does contain at least as much *Spirit of Nitre*, as the other.

And thus a reason may be given, why even six grains of Crystals of Silver may be given by mouth without any danger, when as not two grains of *Sublimate* can be given without a manifest danger, because the Crystals of the Moon have not that circular motion in their parts, as *Sublimate* has, all their tendency is only downwards, and all that they

they can do is to purge by their Acidity.

When *Sublimate Corrosive* is dissolved in Lime-water, the water presently turns yellow, as is seen in the *Phagedenick water*, and it loses so much of its Corrosive quality, that it may be given inwardly after that, without fear of poisoning; I will not offer a reason for the change of the colour, but will leave that to those who have more leisure to consider the particular texture and disposition of pores, which the *Mercury* then has, by means of the acids and *Lime*, so as to make it reflect and modify the light otherwise, and to give it the appearance of yellow, when before it was white. I shall only say, That the *Lime water* does dulcifie and diminish the force of the *Sublimate*; for the particles of *Lime* mix with it, and strike off the points of the *Sublimate*, in which its Corrosive nature or quality lies.

*Sublimate
dulcified by
the water of
Lime.*

It will not be amiss to acquaint you here, that you'll often meet in the Shops of Druggists with a *Sublimate Corrosive* made of *Arsenick*. Now to know the truth of it, you must only rub it with a little *Salt of Tartar*, and if it turns black, there is *Arsenick* infallibly in it; on the contrary if it turns yellow, it is good.

*Proof of
true or false
Sublimate.*

Those who have thought fit to Criticize upon what I have said about the effects of *Mercury*, would methinks have spoken more to the purpose than they have done, if they had objected to me one difficulty that I have made my self since the first Edition of my Book, and which has seemed to me to be the greatest that can be made on this subject. It is this: If the *Mercury* that is given in order to raise a Flux, does joyn with the acid salt

Objection.

of

of our humours, and so does make a *Sublimate Corrosive*, after the same manner as it does in the Matrafs, when it is mixt with *Salt* and *Vitriol*; this *Sublimate* of the body cannot be well made, so long as there is any watry humor in the part, wherein the *Mercury* is mixt with the acids; just as none of it can be made in a Matrafs, until all the Phlegm that's in it, is evaporated away. Now it is not to be conceived, that there should ever happen such a desiccation of humours to the body, for it would be corroded by the *Mercury* so loaded with acids, before it could *Sublime*.

Answer.

To answer this Objection, I say, That although I have made a comparison between the *Sublimation* of *Mercury* that's made in the body, and that which is done in a Matrafs; nevertheless there is this difference between them, That the first is not only made with *Salts* extremely volatile, but is likewise assisted or carried on by the motion of the humours with all their humidity up to the head, whereas this other is made with *fixt salts*, whose acidity is so strongly rooted in the earthy part, that it cannot be separated from it, without a very considerable fire.

Nor must we think that the *Mercury* in the body is loaded with as many and as strong acids, as that in the Matrafs; for if it were so, it would carry destruction, and cause a *Gangrene*, where-soever it came; but it is enough, that its Pores are in part impregnated with them, sufficient to diminish a little of its volatility, and cause those prickings and pains which do happen during the *Salivation*.

If you dissolve *Sublimate Corrosive* in Water, then Filtrate, and separate the filtered liquor into

two

two Viols, and cast into one of them some drops of the *Oil of Tartar* made *per deliquium*, you'll presently have a *Red Precipitate*, that you may dry and use. Then if you drop into the other Viol the volatile Spirit of *Sal Armoniack*, you'll have a fine *white Precipitate*, of the same vertues with that I shall describe anon.

Because *Sublimate Corrosive* is so great a *Poison*, I have thought it not amiss to speak here of the *Counterpoisons* that may be given to such persons who by misfortune have taken it. But lest some may imagine that one and the same *Antidote* can serve for all sorts of *Poisons*, as the *Mountebanks*, and Sellers of *Orvietan* do pretend, and endeavour to persuade, I shall say something of *Poisons*, and their differences.

Whatsoever is able to break and destroy the *Oeconomy* of the body, and the orderly connexion *What Poi- son is.* or derivation of humours, or else to hinder the natural course of the Spirits, is really a *Poison*.

It may be taken, or received two ways; the one outward, as when the Pestilence and many other Malignant diseases (which do proceed from an infected air) do seize upon a man; or when one is bit or stung by venomous beasts. The other inward, as when a man takes *Arsenick*, *Sublimate*, *Hemlock*, *Wolfsbane*, &c.

The same *Poison* does not kill all sorts of *Animals*; as for example, the *Nux Vomica* is a *Poison* to dogs, and yet does many other beasts no hurt at all. The smoke of *Tabaco* does kill *Vipers* in a very little time, although there is hardly a creature that has more life than the *Viper*, and that this smoke will only give a little purging to other creatures. The water in which *Quicksilver*

Different effects of Poison.

P

has

has been infused will kill Worms, and yet does good to other animals. *Arsenick* soon kills a man, and many other creatures; and it will only purge a *Woolf*, and render him more lively than he was before.

All these different effects can only proceed from a diversity of natures, and a difference of humors; for that which is able to tear and destroy one sort, will cause only a light Fermentation in others.

Coagulating poisons.

We must consider two sorts of effects in Poisons; the one does coagulate the blood by degrees, as that of the *Viper*, the *Tarantula*, *Scorpion*, *Hemlock*, *Wolfs-bane*, &c. and whereas these do hinder the motion of the Spirits by this coagulation, the Animal falls into Convulsions, and dies soon after: much after the same manner as it happens when some acid liquor is syringed into a Vein, or Artery.

Corroding poisons.

The others, such as *Sublimate*, and *Arsenick*, do tear & excoriate the *viscera* by their pungent Salts, until they come to gangrene, and then they die.

Remedies against coagulating poisons.

The Medicines which are very properly given to obviate the accidents caused by the first poisons I now mentioned, are volatile Salts, Treacle, *Mithridate*, *Orvietan*, and an infinite number of other remedies of this kind. *Vipers* flesh, and the flesh of *Scorpions* do cure the poison themselves do give, as I shall shew hereafter, when I come to speak of the *Viper*. And hereupon the Reader will not take it amiss, if I give him a short story that is very pertinent to this subject.

An instance of the poison of a Scorpion.

One day I put two living *Scorpions* into a glass-bottle, and then added a little Mouse to their company. Which Mouse running over the *Scorpions* provoked them to bite her till she cried out. Half

a quarter of an hour after, I saw her die of Convulsions. Some hours after this, I threw in another Mouse (a little bigger and more active than the first) to the same *Scorpions*. She leapt upon the *Scorpions* as the other had done before, and was bit by them in like manner, she cried aloud, and was so provoked to revenge her self, that she eat up both the *Scorpions*, leaving only the head and the tail. I would needs observe the end of this Tragedy; I left the Mouse in the bottle, four and twenty hours, and during all that time she had not the least appearance of being hurt, and was only concerned at the being imprisoned. I intended to have dissected her, in order to see whether there were no change in the parts, or in the blood: But a stander by hapning to take up the bottle too carelessly let it fall, and broke it, so the Mouse escaped. Now the Volatile Salts which were in the *Scorpions* flesh, might be said by their active power to hinder the coagulation of the blood, which would soon have been in the veins of the Mouse, after she was bit; but let every body explicate this experiment according to his own principles, I shall resume the thread of my discourse.

It seems very probable, That the Small-Pox, the Plague, Malignant Fever, and many such like diseases, which are occasioned by an Infectious Air, or the corruption of humors; I say, it is very probable, That they do contain an acid, which acts much after the same manner as the coagulating poisons I have been speaking of, but a little more slowly, so that there is less danger, because there is more time for applying the Remedies: and moreover, The Spirits are often strong enough for destroying the coagulations

Many diseases are of the nature of coagulating poisons

which they occasion in the blood and humors. However the same Remedies, which are used against coagulating Poisons, are used very successfully against these diseases.

Remedies
against
corroding
poisons.

The remedies which ought to be given to obviate the effects of *Arsenick*, *Sublimate*, and other corrosive poisons, are of a contrary nature to those I now mentioned; for instead of agitating the mass of blood, and adding new heat to all the body, as those do, these must calm and quiet the violent agitation of humours, and sweeten the acrimony of its salts.

Therefore you must, so soon as you can, make the Patient take a porringer of old *Oil of Olives*, in order to make him vomit; fresh butter, fat, and all unctuous things may very properly be given, because they do not only purge away the poison both upwards and downwards, but likewise (which is a thing very considerable) they consisting of unctuous slimy parts do blunt and dull the edge of those salts which remain of them in the body. You must afterwards make him drink warm milk, and continue the use of it several days, after which you must purge him.

Sublimate
Corrosive
acts quicker
than Arse-
nick.

The effect of *Sublimate Corrosive* is much quicker than that of *Arsenick*, because its acids being presently set to work by the heat of the body, and by the volatility of *Mercury*, do tear and cut in pieces all that is in their way. Wherefore if remedies be not immediately given, after the poison is taken, the person is in a most deplorably dangerous condition.

What has been here said does shew, that it is exceeding necessary for a man to understand the nature of the poisons which are taken, before he
presume

presume to give a counter-poison, or Antidote, and that a box of *Orvietan* must not be esteemed a sure Antidote in all cases.

And hence it is plain, that if the Quacks and Mountebanks, who shew upon stages, should offer to take *Sublimate*, or *Arsenick* by mouth, in order to try the vertue of their remedies, as they pretend to do, all the *Mithridate* they have would never be able to save them. And supposing they did not understand their *Legerdemain* tricks well enough, but should be constrained to swallow such poisons as these, you must not think them such fools as to keep to the remedy they recommend, which would be sure to do nothing else but increase their misery by its acrimonious heat. They would have recourse to the Oil, and other fat substances, to avoid death, which otherwise would certainly follow.

Sweet Sublimate, or *Mercurius dulcis*,
called also, *Aquila Alba*.

Sweet Sublimate is a *Mercury* reduced to a white mass by some broken edges of acids.

Powder sixteen ounces of *Sublimate Corrosive* in a marble or glass mortar; mix with it by little and little twelve ounces of *Mercury* revived from *Cinnabar*: stir this mixture with a wooden Pestle until all the *Quicksilver* becomes imperceptible; then put this gray powder into several Vials, or into a Matraass whose two thirds do remain empty; place your vessel in Sand, and give but a little fire at first, then augment it unto the third degree: continue it in this condition until your *Sublimate*

P 3

is

is made, which usually happens in four or five hours. Break your Viols, and fling away a little light earth that is found at bottom: separate also that which sticks to the neck of the Viols, or the Matrafs, and keep it for Unguents against the Itch, but gather up carefully all that is in the middle, which is very white; and having powdered it, resublime it in Viols or a matrafs as before; separate once more the matter in the middle, and resublime it in other Viols, as before, this third time; lastly, separate the terrestrious matter at the bottom, and the Fuliginous that lies in the neck of the Viols, and keep the *Sublimate* that is in the middle, for it is sufficiently dulcified. There will be Twenty Six ounces and a half of it. Its use is for all sorts of Venereal diseases, it opens obstructions, and kills the Worms, the Dose is from six unto thirty grains in Pills; it purges gently by Stool,

Weight.
Virtue.
Dose.

Remarks.

Sublimate
must never
be powder'd
in a Metal
Mortar.

You must observe never to powder *Sublimate Corrosive* in a mortar made of metal, because it would corrode it, and carry off some part, which would spoil the operation; glass, marble and stone mortars are more convenient, because they can communicate no ill impression to the matter.

Sublimate
mixes but
with a cer-
tain quan-
tity of
Mercury.

Many have written that we should use equal parts of *Sublimate* and *Mercury*, but they did not consider that so great a quantity of *Mercury* could not be here used, and that when the *Sublimate* hath received near about the quantity I have appointed, the rest will remain unmixed.

When

When a matrafs is used for this operation, half ^{The matrafs} its neck must be cut off before-hand; for when it ^{must be} is performed in common matraffes, a great part of ^{short and} the Fuliginous matter not being able to rise high ^{large.} enough falls down again on the *Sublimate*, and hinders it from becoming sweet, because this Fuliginosity contains the more acrimonious part, whereas it will easily fly out of *Viols*, or matraffes with a short neck. Two thirds of each vessel must remain empty, otherwise the *Mercury*, which rarefies like a Spirit, would be apt to break them. That which sticks to the neck of the *Viols* being too acrimonious to be used inwardly may serve for Ointments against the Itch and Tettars.

Sweet Sublimate rises more easily than the *Corrosive*, because it is less loaded with acids. Three hours of a good fire would be sufficient to perfect the *Sublimate*, but it is not enough to *Sublimate* the matter. It is also requisite to let it circulate for some hours in the *Matrafs* or *Viols*, that the Acid points of the *Sublimate Corrosive* may encounter the *Mercurial Globules*, and be blunted by them.

The powder that is put into the *Viols* or *Matrafs*, should be Gray, because the *Quicksilver*, which is only rudely and superficially separated, does give it its Colour: but in the Sublimation it receives a white Colour, because then the parts of *Mercury* are well rarified and mixed with the Acid points of the *Sublimate Corrosive*, which dispose them to reflect the light on all sides: For this Cause, the matter which is twice Sublimated is whiter than that which is only once, and that which is Sublimated thrice is yet whiter; for tho' the Acids be blunted in the first Sublimations, yet

the fragments of their points do enter the Pores of the *Mercury*, and divide it into Insensible parts.

The *Sublimate* fixes about the *Viols* or *Matrass* like a hard stone, because the *Acids* have incorporated with the Globules of *Mercury*, and become one substance with it.

The *Sublimate* that is made in a matrass, loses half an ounce, each *sublimation*; so that an ounce and half is lost in three times, when the operation is done.

Scories.

Six drachms of *Scories* and light earth are found at bottom, and consequently there are but two drachms of matter carried off each *Sublimation*. But if you try this operation in *Viols*, the *sublimate* loses half an ounce more, as having a larger aperture to fly out at, than in a matrass or long neck; and there will be found an ounce of *Scories* and earth.

Why the addition of Mercury makes Sublimate Corrosive Sweet.

It seems a little strange at first that so strong a Poyson as *Sublimate Corrosive* should be reduced into so mild a remedy, by the addition of nothing but *Mercury*. But you ought to wonder no longer, when you consider that those Spirits which caused the Corrosion were then shut up in a strait room, but being now divided and enlarging their quarters, cannot in reason act with such force; besides that by the repeated action of fire the subtler part of their points is blunted against the body of *Mercury*. This may be observed from the figure of the parts of the sweet *Sublimate*; for the points of it are much grosser by far than those of *Sublimate Corrosive*.

The

The Purgative quality of sweet *Sublimate* does consist in the acids that remain; wherefore if you should sublime it twice or thrice more, the *Sublimate* would not be at all Purgative, but only Sudorifick. And it is then more proper to raise a Flux with than it was before; for having lost those salts which by irritating the stomach and guts did render it Purgative, it is the more disposed for rarefaction in the body, and so to joyn with the ferment of Venereal Tumors.

If instead of twelve ounces of *quicksilver* only ten should be mixed with sixteen ounces of *Sublimate Corrosive*, after three sublimations the *Sublimate* will be more Crystalline and more Purgative than it ought; because the Acids of the *Sublimate Corrosive*, not having matter enough to Karise them, and consequently to break their Points, would retain almost the same figure and fineness which they had before, and would excite a Purgative fermentation in the body with far more violent Gripes; for the *Sublimate Corrosive* is only dulcified by a mixture of Alkali, and the *Mercury* becomes an Alkali here.

I see small advantage in studying to render the *Sweet Sublimate* Purgative by stool, nay, it seems to me, that giving it this quality they turn it from its chief use, which is, to search through the body for all the hurtful Acid *Sales*, and to draw them forth with it either by perspiration, or by Stool, or by Urin, or by Salivation: for by rendering it Purgative, the Acids which it contains, determine its motion downwards by Stool, and do allow it neither sufficient time nor Volatility to distribute it self through the several parts of the body. Moreover seeing a great part of the Pores

How sweet
Sublimate
Purger.

What
would fol-
low, if too
little
Quick-
silver
were used.

Purging
not the
Chief qua-
lity of Mer-
curius Dul-
cis.

Pores of this *Mercury* are already filled with the Acids of the *Sublimate Corrosive*; there is little or no room left for those that are in the body. I think therefore that the *Mercurius Dulcis*, made as I have described it, with the Mixture of twelve ounces of Crude *Mercury*, with sixteen ounces of *Sublimate Corrosive*, is much better, tho' it be not so Purgative as that in which there are put only ten ounces of unprepared *Mercury* to sixteen ounces of the other.

I say the same thing of the *Sweet Sublimate*, which has been only Sublimated twice; the Acids of this (it is true) have been enough rarified, but they have not been sufficiently blunted; therefore this *Sublimate* is still more Purgative, than what has been Sublimated thrice. Many boast much of the Purgative quality of the *Sublimate*, in Venereal Distempers: but when there is need of Purging on these occasions, there wants not other Purgatives, which may be more safe than this *Sublimate*; for the Acrimony which comes from the *Corrosive Sublimate* is still to be suspected. *Sweet Sublimate* may be mixed with Purgatives, and it is dayly done without any hazard, and does produce a better effect than the other.

*Mercury so
be given
only in Pills
inwardly.*

Mercury prepared any way whatsoever ought to be taken inwardly no other way than in Pills, but by no means in potion, for fear it should stick in the Gums, and so spoil and loosen the Teeth.

Panacea

Panacea Mercurialis.

THIS is a *Sublimate* dulcified by many Sublimations, and by the Spirit of Wine.

Take what quantity you please of *sweet Sublimate*, prepared, as I have described it. Beat it into powder in a glass or marble Mortar, and put it into a Matrafs, whose three fourths are empty, and from which you have cut off the half of its neck. Set this Matrafs in a Furnace, upon a Sand-bath, and put under it at first a small fire for an hour to warm the matter gently: then augment the fire by little and little until the third degree, and continue it so for about five hours, during which time the matter will sublime. Leave the vessel to cool, and then break it. Cast away (as useless) a little of the light Red Earth which is at the bottom, and separate from the glass all your *Sublimate*: reduce it again into powder, and sublime it in a Matrafs as before. Repeat these Sublimations seven times, changing your Matrafs every time, and casting away the light Earth. After this beat your *Sublimate* into a fine powder in a Marble, put it into a glass Cucurbit, and pour upon it the Spirit of Wine Alkoolized four fingers height, cover the Cucurbit with its head, and leave the matter thus to steep for fifteen days, stirring it frequently with an Ivory slice. After this, place your Cucurbit upon the *Balneum Mariæ* or *Balneum Vaporis*, fit a Receiver to the Nose of the Alembick, lute the joints carefully with a wet Bladder, and by a moderate fire distil all the Spirit

rit of Wine. Then let all the vessels cool, and unlute them, and you will find the *Panacea* at the bottom of the Cucurbit; if it be not dry enough, you may dry it by a small fire of Sand, stirring it with an Ivory or Wooden slice in the same Cucurbit, till it turn into a powder; which you may keep in a glass Vessel.

Virtue. It is a good Remedy against all venereal distempers, Rheumatisms, Obstructions, Scurvy, Kings-Evil, Imposthumes, Tetters, the Itch, Scurfs, Worms, the Ascarides, and old Ulcers.

Dose. The Dose is from six grains to two scruples, made into a *Bolus of Conserve of Roses*.

Panacea in Pills. The *Panacea Mercurialis* may also be made up into Pills, with Gum Tragacanth, and so kept. It is easie to swallow it so.

Remarks.

Etymology. This name *Panacea* comes from the Greek words $\pi\alpha\nu$ and $\alpha\lambda\epsilon\upsilon\omicron$, whence is derived $\pi\alpha\nu\alpha\kappa\iota\alpha$, that is, *Remedium Universale*, an Universal Medicine; or it comes from the word $\pi\alpha\sigma$ all, and from the Verb $\alpha\lambda\epsilon\upsilon\omicron\upsilon\alpha\iota$, to heal, *quasi omnia sanans*.

I have given the Reason in my *Remarks*, upon the sweet *Sublimate*, why the Matrafs should have a short neck, and why so much of it should be void. Two or three hours of fire would be sufficient for sublimating all the matter. But it is good to continue it longer, that the parts of the *Sublimate* may rarifie and circulate in the Matrafs; for by this means what remains of the points of the acids are blunted, and by frequent Sublimations they are reduced into so small and

so

so soft pieces, that they cannot further prick; wherefore, the oftner it is sublimated, it is the less purgative.

The light Earth is a part of the remainder of the *Sublimate Corrosive*; which this *Sublimate* had carried along with it, and which is separated from it every sublimation; wherefore we always find more in the first than in the last: It has its Red colour from the Calcin'd *Vitriol*, and it is truly only a *Caput Mortuum*. The *Mercury* is loaded with all the acids that the Earth could contain, and therefore it is so very light. It was so well mixed in the sublimations that it did not appear; but being rarified by the fire, it separates and precipitates to the bottom of the Matrafs. It may serve outwardly for the Itch and Tettars, mingled in *Pomatum*; but seeing the *Sublimate* it self is much better on this occasion, therefore it is not used.

After the third sublimation of the sweet *Sublimate* there is no more occasion to look for fuliginosities, the powder which sticks on the Neck of the Matrafs is as white and as sweet as the other *Sublimate*, and all must be mixed together.

These Nine Sublimations which I have described for this Operation, together with the Three appointed for the sweet *Sublimate*, do in all make Twelve, which are sufficient to destroy the Acids of the *Sublimate Corrosive*, and to render the matter sweet, that is, to deprive it of its Acrimony: but in case there should still remain some points, not sufficiently blunted, therefore, I steep the *Sublimate*, after it is powdered, into the Spirit of Wine, for uniting and intangling all the parts together, and I leave all in digestion for fifteen

The light
Earth &
Caput
Mortuum.

Virtue.

The Panacea sublimated twelve times.

Why it is steeped in the Spirit of Wine.

fifteen days, stirring it now and then, that this sulphureous Spirit may have time enough to penetrate into the Pores of the *Sublimate*.

The *Balneum Vaporis*, or *Balneum Mariæ* are only proper for drawing off the Spirit of Wine; for if the *Balneum Arenæ* were used, it would break the Cucurbit, because the matter is weighty, and lies at the bottom, so that the igneous particles cannot pass with sufficient force. This Spirit of Wine, which is thus distilled, must not be thrown away, but preserved for a like Operation.

The different operations of mercurialis panacea.

If in this Operation you have used seventy ounces of the sweet *Sublimate*, you shall have sixty two ounces of *Panacea*.

The *Mercurial Panacea* works by Extinction, by Transpiration, by Salivation, and by Purgation.

By Extinction.

It worketh by Extinction, when uniting with the acid humors, which it rencounters in great abundance in the body of the Patient, it sweetens them, and stops their action; therefore it is very good for Obstructions, for Imposthumous swellings; for commonly these diseases are fed by an acid humor, which coagulates in the small vessels, and stops them; but when the cause of it is taken away, the remainder of the humor is easily dissolved.

By Transpiration.

It worketh by Transpiration, for being driven by the heat of the body it passes through the pores, and carries out with it the noxious humors. Thus it cures Tettars, the Itch, old Ulcers, and Rheumatifms.

By Salivation.

It worketh by Salivation, when together with the acid Salts, with which it is impregnated, it

it is sublimated towards the head, where it openeth the salival vessels of the mouth, by raising in it small blisters, as I have explained heretofore: but it is fit to be observed, That it does not operate this way so strongly as Frictions. The reason of this is, because the pores of the *Panacea* being already half filled with the acids that were in the *Sublimate*, cannot admit so many acids of the body, as the crude *Mercury* doth, which is used in Frictions; for *Quicksilver* receives acids only according to the number and quantity of its empty pores: and seeing it is Corrosive in proportion to the points of the entire acids which it contains; therefore it cannot be expected, that the *Panacea* should be so sharp, or occasion such Salivation as Frictions.

Finally, It purgeth, partly by fermentation By Purgation. which the broken pieces that remain in the *Mercury* do raise, and partly by the precipitation caused by the fix'd Salts, which it meets with in the body: for the most part it purges little or none at all; and therefore it is of a different nature from *Aquila Alba*, which is very purgative.

The *Panacea* excites a Salivation much sooner Why panacea causes Salivation better than sweet Sublimate. than sweet *Sublimate*, because being less determined downwards, it is more easily sublimated towards the head; for nothing hinders Salivation so much as purging.

To cause a Salivation by *Panacea* alone, the The method of procuring Salivation by panacea. following method is to be observed. First, The sick Person must be prepared by Purging, Bleeding, and Bathing, as is usual on these occasions. Then you must begin with Ten Grains, making him take so much in the Morning, and as much

at

at Night. The next day give him Fifteen Grains in the Morning, and as much at Night. The third day Twenty in the Morning and as much at Night. The fourth day Twenty Five both in the Morning and at Night. The fifth day Thirty, and so continue to augment the Dose until there be a copious Salivation, and thereafter keep it running, by giving every second or third day Twelve Grains. Now, seeing the Salivation that is raised by this means is not so strong as that which is occasioned by Frictions, it is proper to continue it longer, and so to complete the Cure, it will be necessary to draw it out for thirty days, or thereabouts.

Panacea
worketh
gently.

Many persons prefer the use of *Panacea* to Frictions, and the other methods of exciting Salivation; because it works gently, and is not liable to so many dangerous accidents as Frictions, Fumigations and Plaisters. And indeed it may be said, That this is the method of Curing the Pox, of all others the least troublesome; for the mouth is but gently Ulcerated, the Lips and Tongue can move without much pain, and the Jaws do not appear much swelled. Many also use the *Panacea* while they go about their business, without so much as keeping within doors: for they have but a small Flux, they only Spit; and if they feel the Salivation come too swift upon them, they presently take a Purge, which soon tempers it by precipitating a part of the *Mercury*: They continue this small Salivation for Three Months, Purging now and then by Stool, and taking also at some times *Tartar Em-*
tick.

These

These methods are good for curing Venereal Pox, which are weak and doubtful, as it is very common, Rheumatisms which proceed from the Pox, old Ulcers, Tetters, the Kings Evil when first broke out, and many other diseases. But when the Pox is deeply fixed, and has spread its malignity through many parts of the body, when there appear Lumps, Pustules with a Scurf, virulent and filthy Ulcers, when the Skin falls off, when the person feels great pain in the head and joynts, when he is sad, heavy, and benumbed, when he hath dangerous Hemorrhoids, and that Chankers do appear in several places: in a word, when it is certain there is a true through pox, because of a Gonorrhea or a Chanker, or a Poulain, I then find by experience that the surest way of curing is, to cause a good and strong Salivation according to the usual method of frictions, the Patient being first prepared by bleeding, purging, and bathing. For we have often seen that those who used the *Panacea*, were only half cured, and so were constrained to have recourse to New Remedies, either because the salivation was not great, or of long enough continuance, or because its pores being already half filled, there was not place sufficient for the other Acids, which are the principal Cause of the Pox.

*Signs of a
Pox*

The *Panacea* may very properly and with good success be given the same days that friction is used, for it bringeth the Flux sooner and more gently. By this means also the Flux may be continued or augmented, as occasion requires, by giving a greater or smaller Dose of it.

The Panacea may be given in times of frictions

Panacea is commonly taken in small Pills, made up with the Mucilage of Gum Tragacanth, like
Q Sugar

Sugar plums, which may be easily swallowed without chewing. But sometimes the stomach is so weak that it can dissolve nothing, and then the Pills are found whole and entire in the excrements; wherefore, I advise rather the taking it in Powder, made up into a bolus, with a little conserve.

*Panacea
into a bolus.*

The *Panacea* may also be made up into Tablets, to be chewed by those who can hardly be brought to salivate; for there are some bodies so hard to be moved, that eight or ten frictions, and a great many times taking the *Panacea*, do not suffice to cause a Flux either in the Mouth or in the Womb. In that case, we must not persist in the use of frictions; for experience shews, that after a certain number of frictions, if a salivation does not follow, it is but waste of time to continue it: and besides it may occasion some considerable prejudice; for the great quantity of *Mercury*, which by that means enters the body, is capable of causing the Palsie in some part, by stopping the passage of the spirits in the Nerves. This Accident is so much the more to be feared when there is no sensible Evacuation. It is true, that probably a great part of the *Mercury* wanting acids to fix it, passes by Transpiration, and carries away the subtil part of the Venereal Poison: but then, when it doth so, it is commonly observed, that the Accidents cease, and the sick seems whole; and therefore it is to be presumed, that while the Patient is not perfectly recovered, without a sensible evacuation, there remains some considerable quantity of *Quicksilver* in the body. None ought therefore to use more than five frictions: and if after these a Flux does not follow, the Patient must be made to take a Dose of *Tartar Emetick*,

*Too much
Mercury
dangerous.*

*An Eme-
tick for ex-
citing a
salivation.*

Emetick, or some other vomitive: Then he should be put into a Bath; and while he is there, be made to chew a Tablet of *Panacea* made up without fire, in the manner following.

Take an ounce of *Panacea*, two ounces of fine sugar, a scruple of Cinnamon, and as much of Florence Iris, pulverize them, and mix them all together in a Marble Mortar, with a sufficient quantity of the Mucilage of *Gumm Tragacanth*, made into Orange flower water, compound a paste of these, make them up into small Tablets of a drachm weight, which must be left to dry till there be occasion of using them. If fire be used for making these Tablets, the *Panacea* would evaporate.

I add the Iris and the Cinnamon, to give them ^{Tables of} a little Acrimony in the mouth, which may help ^{Panacea} to open the Lymphatick vessels, and excite a salivation. And if you desire to have them yet a little hotter in the mouth, you may put Ginger instead of Cinnamon.

The powder of *Panacea* may be also taken in the yelk of an Egg.

White Precipitate.

WHITE Precipitate is a *Mercury* dissolved by *Spirit of Nitre*, and precipitated by salt, into a white powder.

Dissolve in a Glass-Cucurbit sixteen ounces of *Mercury* revived from *Cinnabar* with eighteen or twenty ounces of *Spirit of Nitre*: when the dissolution is made, pour upon it salt-water filtrated, made of ten ounces of sea-salt in two quarts of water; add unto this about half an ounce of the

Q 2

volatile

Use.
Dose.

volatile Spirit of Sal Armoniack, there will Precipitate a very white powder, that you must leave for a sufficient time to settle; then having poured off the water by Inclination, wash it several times with Fountain water, and dry it in the shade. It is used to raise a Flux with, it is also a little vomitive. The Dose is from four to fifteen grains in Pills. It is also used in *Pomatus* for Tetters and the Itch, from half a drachm to two drachms, for an ounce of *Pomatum*.

Remarks.

More or less
of the spi-
rit of Nitre
may be used.

Although I do recommend eighteen or twenty ounces of *Spirit of Nitre* for the solution of sixteen ounces of *Mercury*, yet you must know that it is not very necessary to keep too strictly to this same quantity. You may use either a little more, or a little less, according to the strength of the Spirit, or according as it is more or less dephlegmated. I my self do commonly use but an equal weight of it with the *Quicksilver*, because the *Spirit of Nitre* I do use is exactly dephlegmated. You might likewise use *Aqua fortis* instead of *Spirit of Nitre*.

Sweet
Sublimate.

The Dose of *white Precipitate* must be less than that of *sweet Sublimate*, because it retains more acid Spirits; but if you would sublime this *Precipitate* alone in a matrafs, in a gradual fire, you'd obtain a Sublimate as sweet as the other; because the fire having acted upon it, breaks most of its points, and then it may be given in as great a Dose as ordinary *Mercurius Dulcis*.

If you desire to make this *Precipitate* exceeding white, you must dissolve the *Mercury* in a vessel whose

whose mouth is very large, that so the red vapour of the Spirit of *Nitre* may fly out the more easily. When the dissolution is made without the help of fire, the *Precipitate* is the whiter.

The Precipitation of *Mercury* may be made with the Spirit of Salt, as well as the salt in substance.

This is not so easily made, as that of *Bismuth*, because the pores of *Mercury* being smaller than those of *Bismuth*, do retain with more force the acids which are fixt into it. Moreover *Quicksilver* being of a volatile nature does remain suspended in the liquor more easily than *Bismuth*, which is a body altogether fixt.

One Acid
Precipitates
that which
another
Acid dis-
solved.

It may well seem strange that an acid salt, such as sea-salt, should be able to precipitate that which the acidity of Spirit of *Nitre* had dissolved. To resolve this difficulty, you must know that, though our Senses tell us that acids do all perform the same effect, which is to prick and to pierce, yet nevertheless they all do differ in the figure of their points; for according as they have received more or less fermentation, they have also consequently their points more subtile, sharp, and light; and this is attested not only by taste, but the sight also; for if you should Crytallize the same body, by dissolving several parts of it in several vessels by Spirit of Salt, Spirit of *Nitre*, Spirit of *Vitriol*, Spirit of *Alom*, and by Vinegar, you'll observe so many kinds of Crystals different in figure, as there were different dissolutions. The Crystals made by Vinegar will be more sharp than those prepared by Spirit of *Nitre*; those made by Spirit of *Nitre* will be sharper than those by the Spirit of *Vitriol*; those made by Spirit of *Vitriol* will be sharper than those by the Spirit of *Alom*; but of all these

Q 3

Crystals

Cryſtals none will be found to have groſſer parts than thoſe prepared by the *Spirit of Salt*; for theſe Cryſtals do all retain the figure of their conſtituent parts. This now being ſuppoſed, it will be an eaſie matter to explicate our Precipitation, for the ſalt or its ſpirit containing points more groſſ or leſſ delicate than thoſe of *Spirit of Nitre*, and falling on this diſſolution, do move, joltle, and eaſily break the points impregnated with the body of *Mercury*, and ſo do make them let go their hold, whence it comes that *Mercury* precipitates by its own weight.

The ſame Principle may ſerve to explicate, why *Lead* diſſolved in *Vinegar* precipitates by means of the *Spirit of Vitriol*, or *Salt*.

The water
muſt not be
too ſalt.

You muſt obſerve not to make the water too ſalt, for then the great quantity of *Salt* would hinder the *Mercury* from precipitating.

Some of the
precipitate
loſt by the
Lotions.

If your *Mercury* be exactly precipitated, there will be ſome ſmall augmentation of its weight, beauſe of ſome acids broken off from the *Spirit of Nitre* which are entred into it: But as this Metal is volatile and diſpoſed to riſe, it commonly happens, that the water, with which it is waſhed, carries off part of it, ſo that very often you do not recover the ſame weight of *Quickſilver* which was uſed.

The Volatile Spirit of *Sal Armoniack* containing an Alkali Salt, does much help the *Precipitation*, for its agility carries it into every reſſeſ of the liquor, where the ſea-ſalt, whoſe parts are not of ſo active a nature, was not able to go: which is proved from hence, that if you uſe only ſea-ſalt diſſolved in water to make this *Precipitation* with, it will then happen that if after pouring off

off the clear liquor, which swims upon the *Precipitate*, into another vessel, you drop the Spirit of *Sal Armoniack* into the liquor, there falls a considerable quantity of *Mercurial Precipitate*, which may serve like the other. If instead of the volatile Spirit of *Sal Armoniack* you'd use the Oil of *Tartar* made *per Deliquium*, the *Precipitate* would then be reddish.

If instead of the *Precipitates* above mentioned, *Precipitate* you pour hot Urine upon the dissolution of *Quicksilver* by the Spirit of *Nitre*; there will be *of a pale Rose colour* first an Ebullition, and then a Precipitation of *Mercury* into a powder of pale Rose colour. Wash this Powder several times, and dry it, and it purges downwards. The Dose is from Four to Ten Grains. It is useful in Venereal Diseases, for Obstructions, Worms, the Scurvy, and the Itch. *Virtue.*

The Ebullition which happens in this last Experiment shews, That Urine contains an Alkali: but there is no reason to be surprized at it, seeing this liquor, by circulating a long time in the vessels, is filled with many earthy parts which are porous, and consequently Alkali, for such a strong acid as the Spirit of *Nitre*. They are these earthy parts which make the sediment in Chamber-pots, and which fix to the sides of them, in hard crusts, like *Tartar*. *The cause of the Ebullition.*

The earthy parts which are naturally dissolved in Urin, mixing and uniting with the Spirit of *Nitre*, after the Ebullition, becomes a *Coagulum*, which precipitates with the *Mercury*, and continues there, notwithstanding the Lotions; for the water carries off what is most dissolvable. This *Coagulum* is the cause of some small aug-

Augmen-
tation of the
weight
whence it is.

Whence its
purgative
virtue.

mentation of the weight ; for if you use an ounce of *Quicksilver* in this operation, you shall have nine drachms of *precipitate*, after it is well wash'd and dry'd: It is from this also, That this *precipitate* is not so *Emetick* as many other *precipitates* of *Mercury*, for it fixeth the Remedy, and determines it, by its weight, to act by stool.

During the Ebullition, many points of the *Spirit of Nitre* are broken, by tossing them against the body of the Alkali, but yet there remains so many as are sufficient to excite a purgative fermentation in the body.

The Urin to be used on this occasion, should be that of persons sound in health ; it also ought to be clear, and strained (as much as can be) from its sediment : but how clear soever it may appear, there is always in it some portion of *Tartar*. There must no more be poured upon the Dissolution of *Mercury*, than so much as is necessary to make the Ebullition and precipitation, that there may not be too much of this *Tartar* of Urin mixed with the precipitate. It is best to pour it by little and little until the Ebullition ceases, which is a sign that then the acid has been sufficiently weakned. The Urin is heated, that its parts being put in motion, both the ebullition and precipitation may be better and sooner effectuated.

Two objections have been made against my manner of explicating the *Precipitation* of such matters as *Spirit of Nitre* had dissolved, made by Sea-salt.

Objection.

First they say, It is not proper to make the jostles and encounter of Salt-water with *Spirit of Nitre* loaded with bodies which it had dissolved,

olved, to be the cause of its precipitation; whenas the most violent jogs that can be given to the solution, either from an arm, or with matters much more heavy and solid than sea-salt, are not able to cause the precipitation.

This Objection will raise no difficulty to any *Answer.* that are a little skill'd in Natural Philosophy: for although I have said, that by reason the edges of sea-salt are grosser than those of *Spirit of Nitre*, the sea-salt does precipitate what *Spirit of Nitre* had dissolved and suspended; I never meant that if these edges were as big as a mans arm, they would do it the better. It is sufficiently known that there must be a proportionable subtilty of parts between the dissolvent and that which does precipitate, and that the edges of an acid must be otherwise treated than with a cuff of the fist, in order to make them let go their hold. But I intended to make it appear that if sea-salt does jog and shake the edges of *Spirit of Nitre*, it does it by dividing into very minute parts, and thereby entring into the pores of the phlegm, which it would not be able to do if these parts were as big as a mans arm, or were like the solid heavy matters now spoken of.

Secondly, If the grossness of the edges of sea-salt, or the shock they give, did make the precipitation of substances dissolved by *Spirit of Nitre*, we should expect afterwards to find the first, with its gross edges separated from those of *Spirit of Nitre*; whereas upon evaporating and crystallizing the liquor, their edges are indeed reciprocally confounded the one with the other, making together a new body.

I an-

Answer.

I answer, That the shock and jostle which the edges of the sea-salt do give to *Spirit of Nitre*, when loaded with some bodies, does not hinder the edges of *Spirit of Nitre* remaining after the precipitation, from uniting with the sea-salt, by which union the Crystals do become confused.

Why the
white precipitate is
Vomitive.

When according to the usual method, salt water is only used for the *white precipitate*, with the addition of the Spirit of *Sal Armoniac*, this *precipitate* turns yellowish in the drying, and it is also more Vomitive than the other, because the acids of the Spirit of *Nitre* have not been sufficiently broken. I often give eight or ten Grains of the *white precipitate*, which I have described, without any hazard of vomiting: But if this Dose be exceeded, a Vomiting sometimes follows. A Vomiting caused by the *white precipitate* is good to further a Salivation, when it comes not easily.

I shall here add one preparation more, that is very proper to raise a Salivation with.

Mercurial
Waters.

Take an ounce of the solution of *Mercury* made in Spirit of *Nitre*, put it into a glass-vessel, and pour upon it three or four and twenty ounces of water, all the liquor will turn white, let it settle until it becomes clear, filtrate the liquor, and keep it for use.

Dose.

This water may be given from half an ounce to an ounce, in a glass of *Ptisan*, or broth. It vomits gently, and provokes a Salivation; some do drink half an ounce of it to cure the Itch, but they ought to be purged and bled before-hand.

Virtue.

Another

Another white Precipitate of Mercury.

THIS Operation is a *Corrosive Sublimate*, dissolved by the water of *Sal Armoniack*, and precipitated by the Oil of *Tartar*.

Dissolve four ounces of *Sal Armoniack* in sixteen ounces of Water, Filtrate this liquor through brown Paper in a glass vessel, add to it four ounces of the powder of *Corrosive Sublimate*, which will dissolve it self in a short time: then pour upon the dissolution, by little and little, the Oil of *Tartar per deliquium*, upon which an Ebullition will follow, and afterwards a *white precipitate*: Continue pouring into it till there be no more *precipitate*, and then add a great quantity of water, and leave the whole matter to rest until the liquor which is above, be clear: pour it off by inclination, and wash your *precipitate* several times, and then dry it in the shade. It hath the same Vertues with the former, and the same Dose is used.

Vertue.
Dose.

Remarks.

The dissolution of *Sal Armoniack* is purified by filtration, because commonly it contains much filth. The *Corrosive sublimate* dissolves in half an hour in the open Air, and the dissolution may be hastned by stirring the vessel.

The quantity of the Oil of *Tartar* to be used, on this occasion, is two ounces, or two ounces and a half. This liquor contains an *Alkali Salt*, and causes an ebullition and precipitation, because the

Cause of
the Ebulli-
tion and
precipita-
tion.

Why so
much water
is added to
the dissolu-
tion.

the acid points of the *Corrosive Sublimate* enter violently into the Pores of this Salt, divide the parts, and break the points, so that they cannot uphold the *Mercury* longer; and therefore it falls to the bottom in powder. A great deal of Water is added, that the powder may precipitate more easily, by the dissolving and weakning of the Salts. This powder is washed for taking away any Tincture which these Salts might have given it, and it is dried in the shade, for preserving its White Colour; for the Sun makes it Black, by re-uniting with its heat the parts of the *Mercury*, which are only White when separated.

Sweet Sub-
limate.

There is no hazard of giving this *precipitate* inwardly, tho' it be made of *Corrosive Sublimate*, because it has been sufficiently sweetned by the *Sal Armoniack*, and the Oil of *Tartar*. It may be sublimated as the other, to turn it to a *sweet sublimate*.

Diversity of
Colours.

The Liquor of the Salt of *Tartar* gives a White Colour to the *Sublimate*, dissolved by the *Sal Armoniack*. It turns it Red when it is dissolved in common water alone; and it makes it Yellow when the *Sublimate* is not dissolved: Further, the same Liquor gives a reddish colour to *Mercury*, dissolved by *Aqua fortis*. All these different colours proceed from the diverse dispositions of the parts of the matter, which cause it to reflect the light differently.

Red

Red Precipitate.

THIS preparation is a *Mercury* impregnated with Spirit of *Nitre*, and calcin'd by fire.

Take eight ounces of *Mercury* revived from *Cinnabar*, dissolve it in a sufficient quantity of Spirit of *Nitre*, which is eight or nine ounces; pour the dissolution into a Viol, or Matrafs with a short neck, set it in Sand, and evaporate all the moisture with a gentle heat, until there remains a white Mass; then quicken the fire by little and little to the third degree, and keep it in this condition till all your matter is turned red, then take it off the fire, let the Viol cool, and break it to obtain your Precipitate, which weighs nine ounces.

White
mass.

Red mass.

Weight.

Vertue.

Use.

It is a good Escharotick, it eats proud flesh; it is used for the laying open of Chancres, mixt with burnt Alom, *Aegyptiacum*, and the common Suppurative. Some do give it inwardly to four grains for to raise a Flux with, but this is dangerous, unless rectified Spirit of Wine be burnt two or three times upon it.

Remarks.

This Preparation is improperly called *Precipitate*, here being no Precipitation at all.

Many Authors have thought they could much encrease the redness of this *Precipitate*, by *Cobobating* it, or distilling Spirit of *Nitre* three times upon the white mass; but I have found by experience both ways, that these circumstances are of no use.

The

The white Mass which remains after Evaporation of the humidity is a mixture of *Mercury* with a great many acid Spirits, for it weighs three ounces more than the *Mercury* did which was dissolved; it is extreme Corrosive, and fiery, if applied to the flesh, but according as it is Calcined in order to make it red, the edges of the Spirit of *Nitre* which caused the Corrosion to strike off, and fly into the Air; whence it comes to pass, that the more we desire to encrease its redness by Calcination, the less it weighs, and the less it corrodes. Some Chirurgeons observing this effect do chuse the Precipitate that is not so red as usual, when they would make an Eschar quickly.

Red Sublimate.

If you still continue the fire some hours under the red mass, it will sublime, and still retain its colour; this sublimate is not so Corrosive as the other; which makes me think that the points of Spirit of Salt are necessary to make a sublimate very Corrosive. The reason why it sublimes, is because the *Mercury* being delivered from a great many acid Spirits, which did fix it, has power to rise with those that remain. But because these remaining Spirits do moderate a little its volatility, it makes a stop in the middle of the Viol.

Arcanum Corallinum, or red Precipitate Sweetned.

Some do put red *Precipitate* into an Earthen Pot, and pour upon it Spirit of Wine well rectified, then fire it, and when the Spirit is consumed, they add more, and burn it as before; they repeat the adding Spirit of Wine, and burning it six times, and then call this Preparation *Arcanum Corallinum*. The Spirit of Wine by burning does carry off some edges of the *Precipitate*, and joyns it self to the rest, so that this *Precipitate* is sweetned and rendered fit to be taken inwardly.

If

If by way of curiosity you pour Spirit of *Vitriol* upon common red *Precipitate*, such as I have described, a dissolution will soon follow, because Spirit of *Vitriol* joyning with the Spirit of *Nitre* that remained in the *Precipitate*, an *Aqua fortis* must happen from their union, which is able to dissolve imperceptibly the parts of *Mercury*; but this dissolution will happen without any *Ebullition*, because the *Mercury* has been already rarified by an acid, so that the Spirit of *Vitriol* does only dissolve them without making any commotion. The solution is clear like other solutions of *Mercury*, without any appearance of redness, and the same Preparations may be made with it, as are used to be by the solution of *Quicksilver* in *Aqua fortis*.

If instead of Spirit of *Vitriol* you pour Spirit of *Salt* upon the red *Precipitate*, it turns presently into a curious white, because the Spirit of *Salt* does break the force of the Spirit of *Nitre* that was in the red *Precipitate*; and the same thing must happen here as does when Spirit of *Salt* is poured upon the solution of *Quicksilver*; for although red *Precipitate* be a dry body, yet it is nothing else but a mixture of *Quicksilver*, and Spirit of *Nitre*.

I have given the reason why Spirit of *Salt* comes to weaken Spirit of *Nitre*, in my remarks upon white *Precipitate*.

As for the sudden change of colour, it is indeed somewhat strange, that a matter which is grown red by *Calcination*, should in a minutes time turn so exceeding white.

This Effect can be attributed only to the dissolution which the acid spirit of *Salt* does cause in the parts of red *Precipitate*, and to the disposition it puts them anew into, so that their *Superficies*

is

is put into a capacity of reflecting the light in a right line to our eyes, to give the appearance of a white colour; for if by means of another sort of liquor, or else by fire and some alkaly body, the disposition of the parts of your *Precipitate* is again changed, it will obtain some other colour, or else it will return and revive into *Quicksilver*.

If you pour the volatile spirit of *Sal Armoniack* upon red *Precipitate*, it turns into a grey powder; but if you throw a great deal of water upon it, it becomes a milk, though none of the whitest. The same thing happens, when you drop Spirit of *Sal Armoniack* into the solution of *Quicksilver* made with Spirit of *Nitre*; for soon after the effervescency is over, a grey powder is seen to *Precipitate*, and if you add to it water, it becomes a milk of the same whiteness as the other.

Common red *Precipitate* then is subject to the same alterations as the solutions of *Mercury*, the red colour giving no particular impression to it; which truly is a good proof that colour is no real thing, but wholly depends upon the modification of parts.

Red Philo-
sophical
Precipitate.

A red *Precipitate* may be made by Calcination alone, in the following manner.

a Philoso-
phical
Month.

Put into a Matraass with a long Neck, and of indifferent largeness, four ounces of *Quicksilver* revived from *Cinnabar*, set your vessel in sand upon a furnace, and put under it a small fire of Coals to heat the matter a little: continue this degree of fire the space of forty days and as many nights, which is a Philosophical month, or till the *Mercury* be reduced into a red powder: then leave the vessel to cool, and keep your *Precipitate*: it is called the red *Philosophical Precipitate*. It is not

not so sharp as the former, and may be taken inwardly for raising a Salivation: but this preparation has never been much used, probably because it puts one to too much trouble. It is called Precipitate as improperly as the former, for there is no *Precipitation* in the case.

The Reduction of *Mercury* into red powder proceeds from the Igneous particles which are introduced into its pores, which rarifie it, and which give to its insensible parts some other disposition and motion than they had before.

Green Precipitate of Mercury.

THIS preparation is a mixture of *Quicksilver* with *Copper*, and acid Spirits.

Put four ounces of *Quicksilver* into a Matraass, and put an ounce of *Copper*, cut into small pieces, into another Matraass. Pour upon the *Quicksilver* four ounces of the Spirit of *Nitre* or good *Aqua fortis*, and upon the *Copper* an ounce and half of the same dissolvent: then set your Matraasses in hot sand, and leave them there till the Metals be dissolved: Mix your dissolutions in some earthen vessel, and evaporate the humidity by a fire of sand untill the matter be reduced into a Mass: encrease the fire under the earthen vessel, for Calcining this Mass about an hour and a half, take away the fire, and leave it to cool, then separate the matter from the earthen vessel, and powder it in a Stone or Marble Mortar, there will be six ounces of it. Again put it into a Matraass, and pour upon it distilled Vinegar to the height of six inches or thereabouts, jumble all well, and

R

p. 12

put your Matrafs to digestion upon hot sand: leave it there four and twenty hours, stirring it now and then; afterwards augment the fire to make the liquor boil about an hour, until the Vinegar be of a greenish colour, inclining also somewhat towards blue; leave it then to cool, and pour it off by inclination. Put other distilled Vinegar upon what remains, and proceed as before, till you have drawn off the whole Tincture: Mix your dissolutions, and evaporate the humidity in an earthen or glass vessel, upon a sand Bath, by a small fire, untill the matter comes to the consistency of honey, and that it begin to sparkle, take it then off the fire, and it will harden as it cools; put it into powder and keep it: there will be four ounces, one drachm and a half of it. It is a specifick for virulent *Gonorrhoeas*, which is given both to make them run, and to stop them. It is used in the Pox, for Phymosis, for Chancres; and they give it both inwardly and outwardly. The Dose is from two grains to six in Pills, or in a bolus of some Conserve. It Purges both upwards and downwards.

Virtue.

Dose.

The yellow matter which remains.

There will remain a yellow matter, which has not been dissolved by the Vinegar: It is much like to *Mineral Turbith*, dry it, and there should be two ounces and a half of it. It is used in Pomatums for the Itch, and they put one drachm of it to an ounce of Pomatum.

Remarks.

The green Precipitate sweeter than the other.

Some use only half an ounce of Copper for four ounces of *Quicksilver* in this operation. The green precipitate, which arises from it, is indeed not

not so acrimonious as this of ours, but neither also is it so operative.

The *Copper* is cut into small pieces, that it may dissolve sooner; and it is best to dissolve these two Metals separately, because the pores of the *Copper* being larger, and better disposed to receive at first the impressions of the Acid, than those of *Mercury*, therefore the points of the Spirit of *Nitre*, which are most agitated, would turn towards the *Copper*, so that the *Mercury* would be dissolved with difficulty.

When the Acids penetrate these Metals, there happen Ebullitions in both the Matraſſes, with great heat and red fumes, for the reasons I have given above. It is therefore fit to set the Matraſſes within the Chimney, for shunning the vapours that are prejudicial to the Lungs. If that quantity of the dissolvent which I have prescribed, be not sufficient to dissolve the Metals; what is dissolved must be separated, and New spirit of *Nitre* poured upon what remains at the bottom, for perfecting the dissolution.

Tho' the *Copper* be more porous than the *Mercury*, yet it requires more of the *Menstruum* to dissolve it, because its parts are separated and upheld with more difficulty; whereas those of *Mercury* being round and volatile, can with less trouble be exalted in the dissolvent, as has been said before.

If the Matraſſes be not placed upon hot sand, the dissolution will proceed slowly.

The first humidity that evaporates after the dissolution, is only the Phlegmatick part of the Spirit of *Nitre*, for the more acid continues with the Metals. The Mass is *Calcined*, that the greatest

R 2

pure

part of the acid may be dissipated, and that there may not be so much acrimony left in it. The matter must be Calcined in a pot or plate of common Earth which is not glazed.

*Proper
Mortars.*

For powdering this mass, Mortars of Metal must not be used, because it penetrates them, and receives some alteration by the impregnation: It probably also dissolves something in the Mortars of Marble or Stone, but yet these matters do not any prejudice to the Operation.

There are at least two ounces of the acids of the mass consumed by the Calcination; for after the evaporation of the humidity, it weighs only eight ounces or a little more.

*Use of di-
stilled Vi-
negar.*

Distilled Vinegar serves to dissolve the most rarified part of the mass, and it helps also to correct a little its acrimony; for the acids of the Vinegar, uniting with those which remain of the Spirit of Nitre, do qualify in some manner their motion, by adding to their weight. The green colour of this preparation comes from the Copper, which, when rarified, appears always green or blue.

The Evaporation of the humidity should be by a small fire, especially towards the end; for a violent fire would evaporate all the Mercury.

*Whence the
Sparkling.*

The sparkles which appear when the matter turns to the consistency of Honey proceeds from the Sulphur of the Copper. When it begins to sparkle, it is fit to take out a little of the matter, and to set it to cool, to try whether it may be beat into powder: and if so, then the whole must be taken from the fire.

*The Name
improper.*

This Preparation is called very improperly *Precipitate*, seeing it is not made by precipitation.

on. There still remains in it much acrimony, caused by the *Copper* and the acids. And hence it comes to pass, that it is both *Emetick* and *Purgative*; for the acids being mixed both with the Sulphur of *Copper* and with *Mercury*, therefore they are qualified to prick the Fibres of the Stomach so strongly, as to excite a Convulsive motion, which is the cause of Vomiting: And as in Vomiting there precipitates some part of the matter towards the intestines, therefore it also excites there the purgative fermentation.

Whence it has the Vomitive and Purgative vertue.

The *Green Precipitate* is in use especially for *Gonorrhœas*. Some are made to take it in the beginning of a Clap, and it is given them every second or third day till it be cured. But I think it better to delay giving this until the matter has run at least a fortnight, because this Remedy stops it too soon when it is taken in the beginning. Moreover frequent Vomiting is very troublesome to the Patient, and sometimes destroys the stomach. It is to be taken as all other preparations of *Mercury*, in Pills, or in a Bolus, not at all in a Potion, because then it would remain amongst the Teeth, and excite but a small Salivation. It may be mixed in some proper Conserve, or in some Purgative Electuary, or in some Pills. The Vomitive quality is tempered by the Purgative, which gives it more disposition to purge downwards: But as its principal effect is from Vomiting, it must not be mixt with any other Purgative Composition, but what is necessary to be a fit vehicle for it. It is fit to further Vomiting by some spoonfuls of fat broth.

Violent Vomitives and Purgatives do often stop the Flux of a *Gonorrhœa*, or do abate it, because

How the Green Precipitate stops a Clap

R 3

cause they turn away the humor. Such as are composed of *Mercury* are to be preferred to others, because, besides their purgative effect, they do mix with that Venereal Venom which remains in the body, and do entirely destroy it, or carry it off by Transpiration.

The volatile or sulphureous part of the *Copper*, which enters into the composition of the *Green Precipitate*, does cause Vomiting: and the fixt *Vitriol* is as an Astringent to stop the Clap from spreading further.

Turbith Mineral, or Yellow Precipitate.

THIS Preparation is a *Mercury* impregnated with the acidity of the Oil of *Vitriol*.

Put four ounces of *Quicksilver* revived from *Cinnabar* into a glass Retort, and pour upon it sixteen ounces of Oil of *Vitriol*; set your Retort in Sand, and when the *Mercury* is dissolved, put fire underneath, and distil the humidity; make the fire strong enough toward the end, for to drive out some of the last Spirits of all; afterwards break your Retort, and powder in a glass Mortar

White mass. a white Mass you find within it, which weighs five ounces and a half; pour warm water upon it,

Yellow powder. and the matter will presently change into a yellow powder, which you must dulcifie by a great many repeated Lotions, then dry it in the shade, you'll

Vertue. have three ounces and two drachms of it. It purges strongly, both by Vomit and Stool, it is given

Dose. in Venereal Maladies, the Dose is from two grains unto six in Pills.

Remarks.

Remarks.

Though that which is improperly called Oil of *Vitriol*, be the strongest and most Caustick acid of this Mineral Salt, it is nevertheless much weaker than Spirit of *Nitre*, and so requires a greater quantity of it, and longer time to dissolve the *Mercury* in, for there's much a-do to dispatch the solution in ten hours. That which is distilled is exceeding weak, because the *Mercury* retains the greatest part of the acid Spirits, and they are the things that purge so strongly, although many of them be carried off by the Lotions.

All these Preparations are nothing but so many different shapes of *Mercury* made by acid Spirits, which according to the different adhesions, do cause such different effects.

All these *Precipitates* and *Sublimates* may be revived again into flowing *Mercury*, by mixing them with Lime, and distilling them, as I have said in the reviving of *Cinnabar* into *Quicksilver*, because the alkali of Lime destroys those acids that disguised the *Quicksilver*.

Oil or Liquor of Mercury.

THIS preparation is an acid liquor loaded with *Mercury*.

Put the Lotions of the white Mass, that *Turbith Mineral* was made of, into an earthen pan, or glass vessel, evaporate in Sand all the Liquor, until there remains at bottom a matter in form of Salt, which weighs two ounces and a drachm,

R 4

put

Use.

put the pan in a celler, or other cool place, and there leave it until this matter be almost all dissolved into liquor. It is used for the laying open Venereal Shancres, and eating the flesh, Pledgets being dipt into it,

Remarks.

This liquor is nothing but *Mercury* so penetrated and divided by the acid Spirits of *Vitriol*, that it can dissolve like a Salt: now for that it contains these corrosive Spirits, it eats and corrodes where-ever it touches, like unto a Sublimate Corrosive.

This liquor may be made with Spirit of *Nitre*, and then it will be more violent in its Operation, but because it would then pierce too much, and cause dangerous accidents, I would rather chooise to prepare it with Oil of *Vitriol*.

If you drop a few drops of the Oil of *Tartar* made *per Deliquium* into this liquor, there will fall immediately a Mercurial Precipitate, because the alkali of *Tartar* will break the edges that hold up the *Mercury* dissolved,

Another Oil of Mercury.

THIS Preparation is a Sublimate Corrosive dissolved in Spirit of Wine.

Powder well an ounce of Sublimate Corrosive, and put it into a Bolthead, pour upon it four ounces of Spirit of Wine well rectified upon salt of *Tartar*, stop well your Bolthead, and let it infuse cold, six or seven hours, the Sublimate will dissolve;

dissolve; but if any sediment remain at bottom, decant the liquor from it, and pouring upon the sediment a little more Spirit of Wine, infuse it as before, to finish the solution, mix your solutions, and keep them in a Viol well stoppt.

This is an Oil of *Mercury* milder than the former, it is good in Venereal Shancres, especially when there is any fear of a Gangrene, you may use it with pledgets like the former.

Remarks.

Spirit of Wine well rectified can dissolve sublimate corrosive, but it is not able to dissolve *Quicksilver*, nor even *Mercurius dulcis*; the reason of which is, that the Sublimate being a *Mercury* extremely rarified, and already as it were suspended by acids, the Spirit of Wine insinuates into it by little and little, and dissolves its parts; but *Quicksilver* and *Mercurius dulcis*, consisting of parts too close and compact, the Spirit of Wine which is a rarified Sulphur, cannot give shakes strong enough to disjoyn or separate them.

This liquor is milder than the former, because Spirit of Wine, which is a Sulphur, does so blunt the acid edges of Sublimate Corrosive, that they cannot act with that strength they did when they were at liberty.

Other Precipitates of Mercury.

THESE Preparations are only *Sublimate Corrosive* dissolved and precipitated into powders of different colours.

Mix

Mix four or five ounces of *Sublimate Corrosive* powdered, in a glass or marble Mortar with eight or nine ounces of warm water, stir them about for half an hour, then let the liquor settle, and pour it off by inclination, filter it, and divide it into three parts to be put into so many Viols.

Pour into one of these Viols some drops of the Oil of Tartar made *per Deliquium*, there falls im-

Red Precipitate. mediately a red *Precipitate*.

Drop into another of these Viols some volatile Spirit of *Sal Armoniack*, and you have a white *Precipitate*.

Pour into the last of these Viols five or six ounces of Lime-water, you have a yellow water that is called *Phagedenick-water*, or water for Ulcers, because it is good to cleanse and heal Ulcers, the Chirurgeons do frequently use it, especially in Hospitals; if you let the liquor settle, it will let fall a yellow *precipitate*.

Yellow Precipitate, or Phagedenick water.

To obtain these three *Precipitates*, you are only to pour off the clear water by Inclination, wash them, and dry them apart.

Red *precipitate* may be used like that I described before, but it is not so strong; it is the truest red *precipitate* of any.

The white *precipitate* has the same virtues as the other,

Yellow *precipitate* may be used in *Pomatus* for the Itch, half a drachm, or a drachm of it is to be mixed with an ounce of *Pomatum*.

The *Sublimate* which remains at the bottom of the Mortar, being dried may be used in *Pomatus* for the Itch, like yellow *precipitate*.

Remarks.

Remarks.

Sublimate being a *Mercury* loaded with acids, common water is able to dissolve some of it, because these acids do rarify it, and make a kind of salt of it; but because there are not acids enough in it to dissolve all the *Mercury*, the most compact part of it remains at bottom, the liquor is filtrated to clear and purifie it the more, it is as clear and transparent as Fountain water.

If by way of Curiosity, you should drop into the Viol of red *precipitate*, that I now described, some spirit of *Sal Armoniack*, and would shake the liquor a little, it would presently turn white, and your *precipitate* would be white; but if instead of spirit of *Sal Armoniack* you would use spirit of *Vitriol*, an *Ebullition* would rise in it, and the red liquor would become clear and transparent as common water.

Change of
Colours.

Because the Oil of *Tartar* is an alkali salt dissolved, it breaks the edges of the acid which held up the *Mercury* imperceptible, and serv'd as Finns to make it swim in the water, so that this *Mercury* having nothing left to bear it up, must needs *precipitate* by its own weight. The same thing happens when spirit of *Sal Armoniack* is thrown upon the other part of the solution of *sublimate Corrosive*. For this spirit being in like manner an alkali, produces the same effect as the Oil of *Tartar*.

But altho' alkalies do all agree in this, that they break and destroy acids, nevertheless there is always some difference in their action.

And this evidently appears in those differently coloured *precipitates*, for this diversity can be attributed

tributed only to this, that they having in several manners wrought upon acids; do dispose and modify the parts of the precipitated body, so as they may be capable of making different Refractions of Light.

These *Precipitates* are no longer poisons, though they come from *Sublimate Corrosive*, and there's the same reason for it, as there is for the *precipitations*; for seeing that which gave the *Corrosion* was an acid, when this acid is destroyed by such powerful alkalies as are Spirit of *Sal Armoniack*, and Oil of *Tartar*, that which remains must become sweet.

When Spirit of *Vitriol* is thrown upon the liquor of red *Precipitate*, there rises an ebullition, because the acid does penetrate the alkali salt of the Oil of *Tartar*, and this alkali being destroyed, the acid dissolves what was *precipitated* before, whence it comes that the liquor clears up, and turns into poison as it was before.

If you would again pour Oil of *Tartar*, then Spirit of *Sal Armoniack* upon it, there would happen new red and white *Precipitates*, which might again be dissolved, and the liquor made clear again, by adding to it more Spirit of *Vitriol*, but only a greater quantity of this Spirit must be used than was before.

CHAP.

CHAP. IX.

Of Antimony.

Antimony is a Mineral consisting of a Sulphur like unto common Sulphur, and of a substance near approaching to Metallick: It is called *Stibium* in Latin. It is found in many places in *Transylvania, Hungaria, France, Germany*. Sometimes you may meet with some of the mineral *Antimony* at the Druggists, that is to say, just as it is taken out of the *Mines*, but that which is commonly brought among us hath been melted, and moulded into cakes of a Pyramidal form.

Stibium.

A Mineral.

You must chuse that which is in long shining needles, and not expect to find it of a reddish colour, as many Authors do advise; for in a hundred weight of this Mineral, you'll hardly find one piece of this kind. The occasion of this error came from the Alchymists, who thought that *Antimony* did contain a Sulphur like unto that of Gold, and that the reddish sort had more of it than the black; but this pretended Sulphur is as imaginary as that of Gold. This reddish colour does doubtless proceed either from the heat of the Sun coming to it, or from a participation of the subterranean heat, bestowed more on such pieces, than the rest; for when the Sulphur of *Antimony* is rarified, it assumes a red colour, as may be seen in the operation, called *Golden sulphur of Antimony*.

Antimony

Antimony will not dissolve, but with *Aqua Regalis*, which has made a great many Alchymists think, that this Mineral was an imperfect Gold.

Different
names
given to
Antimony
by Alchy-
mists.

Sometimes they have called it the *Red Lyon*, sometimes the *Wolf*, because it turns Red, and devours all Metals except *Gold*. Some have called it the Root of Metals, because it has been found in all Metallick Mines: It has been named *Proteus* by some, because it takes on divers forms and colours; by others the *Sacred Lead*, the *Lead* of Philosophers, the *Lead* of the *Wife*, because it was believed that it was akin to *Saturn*, who devourerth his Children as this doth Metals. Many other names have been given to it, which need not to be mentioned here. They have laboured with great application to find out the Philosophers stone by this Mineral.

Antimony
Emetick
because of
its Acid
salt and
Sulphur.

Although nothing but a metallick substance mixt with Sulphur can be perceived in the analyzing of *Antimony*; nevertheless considering its Figure, somewhat like that of salt-peter, and its Emetick quality, which can proceed from nothing but a puncture made in the stomach, there is reason to think that it contains an acid salt; but because the edges of this salt are sheathed in a great deal of Sulphur, it cannot exert its activity, without opening a way for it, either by salts which divide the Sulphur, or by Calcination which carries off its grosser part. Notwithstanding it is not to be understood that the Emetick faculty of *Antimony* does consist in this salt alone; for if it were alone, it would no more produce this effect than other acid salts do, but it is assisted by the Sulphur, which serves for a Vehicle to exalt it towards the upper Orifice of the stomach. Thus *Antimony* may

may be said to vomit, by reason of the Saline sulphur it contains.

Crude Antimony is used in Sudorifick decoctions, *Decoction of Antimony is Sudorifick.* when we would dissipate a tumor by Transpiration; but great care must be had that no acids may enter into the Decoction, for then it would open its body, and render it Emetick. It is dangerous also to take it in substance, because it may be apt to meet with an acid in the stomach that would open its body, and thereby cause a great vomiting to follow.

The reason that *Crude Antimony* causes sweat, is because of some Sulphureous Particles that separate from the *Antimony*, which not being strong enough to make one vomit, do therefore work by transpiration.

Common Regulus of Antimony.

THIS preparation is an *Antimony* rendred more heavy, and more metallick by the separation that is made of its grosser Sulphurs.

Take sixteen ounces of *Antimony*, twelve ounces of crude Tartar, and six ounces of Salt-peter purified; powder them and mix them well together, then heat a large Crucible red-hot, throw into it a spoonful of your mixture, and cover it with a Tile until the detonation is over, continue to throw into the Crucible spoonfuls of this mixture one after another, until all of it is spent; then light a great fire about it, and when the matter hath been some time in *Fusion*, pour it into a Mortar, or an Iron mould greased with suet and heated, then strike the sides of the said mould or mor-

tar

tar with tongs to make the *Regulus* precipitate to the bottom; when it is cold, separate it from the dross that remains on the top of it with a hammer, and after you have powdered it, melt it in another Crucible, then throw into it a little Salt-peter, there will rise some little flame from it, then pour out the matter into the iron mortar well cleansed and greased, let it cool, and you have four ounces and a half of *Regulus*.

Weight

Perpetual
Pills.

If you melt it over again, and form it into balls of the bigness of a Pill, you have a *perpetual Pill*, that is to say, such as being taken and voided fifty times will purge every time, and yet there's hardly any sensible diminution.

Cups of
Antimony.

This *Regulus* is melted in a Crucible, and then cast into moulds to make Cups and Goblets. But it is somewhat hard to do it, by reason of a sharpness in the *Regulus* that hinders its parts from uniting so as to spread well. If you put White-wine into these Cups or Goblets, it becomes Vomitive, like the *Vinum Emeticum* I shall speak of anon.

Remarks.

The name *Regulus* signifies Royal, and is given to the most fixt and hardest matters of many minerals and metals.

This Preparation is made in order to open the *Antimony*, and purifie it from a great deal of gross Sulphur that it is impregnated with, and to this end it is Calcined with Tartar and Salt peter, which do easily flame, and carry off with them good store of this Sulphur, the rest remains in the *Fæces*, as I shall shew in the following operation.

The

The mixture is cast into the Crucible by little and little, for fear lest if it should be put in all at a time, the detonation growing too violent; and the matter rarefying too much, it might rise over the Crucible.

The detonation proceeds from the union and mixture of the Volatile parts of *Salt peter* with the Sulphurs of *Antimony* and *Tartar*: But as there is but little *Salt peter* in comparison with the other Sulphurs, therefore the inflammation is but small.

You must not grease the Iron Mortar with Oil, by reason of a little humidity that it contains, which would make the matter rise and tumble out. It is greased, to the end that the matter not sticking to the mortar may separate from it the more easily.

The *Regulus* is melted again, and *Salt peter* thrown into it, to the end, that some little superficial sulphur, which remained of the dross, may fly away, and the *Regulus* may remain the purer.

Fifteen ounces of dross will be found to four ounces and a half of *Regulus*, and there were used four and thirty ounces of mixture in this operation, so that you lose fourteen ounces and a half during the time it is on the fire.

Although good store of the *Antimonial* Sulphurs do exhale, the *Regulus* is notwithstanding still loaded with them, and it is they which chiefly give it its Vomitive virtue; for the Vomiting doth proceed from a very quick motion that these Sulphurs do give to the stomach, by pricking its Fibres with some salts that they carry along with them.

If you mix the Emetick with an Infusion of *Senna*, or some such purgative, it works as much by stool as by vomit. because these Remedies do precipitate with them some part of the Sulphurs.

S

When

*Diminution
of the Mat-
ter.*

*Whence
Antimony
hath its
Vomitive
quality.*

*Why the
Pill purges
perpetually.*

When a man swallows the *Perpetual Pill*, it passes by its own weight, and purges downwards: it is waſht and given again as before, and ſo on perpetually.

Almoſt all Chymiſts have written that this Pill loſes nothing at all of its weight, though taken ſeveral times. 'Tis true indeed the diminution is but very ſmall, yet nevertheless it would not be hard to remark it in ſome meaſure. It may be ſaid alſo that in place of the Sulphureous parts which do exhale to cauſe the vomiting, ſome extraneous bodies do ſucceed in their place, as it happens when *Antimony* is Calcined in the Sun.

When this Pill hath been taken and voided twenty or thirty times, it purges not ſo much as it did at firſt, as well becauſe the more ſoluble parts of the Sulphur are gone, as that what remains doth paſs without any great effect. The ſame doth happen to Cups or Goblets, which can't make the Wine ſo Emetick as before, after they have been filled twenty or thirty times.

*Whether
the perpetu-
al Pill be
proper for
the Miſe-
rere.*

Some do preſcribe the *Perpetual Pill*, in the diſeaſe called *Miſerere*, but this practice is not without danger, becauſe the ball ſtopping ſome- time in the Inteſtines, which are knotted or twiſt- ed together in this diſeaſe, may cauſe an Inflam- mation, and ſo exulcerate the part. It is given in the Colick, and then it does well.

*Why Wine
takes the
Emetick
virtue of
Antimony
better than
other li-
quors.*

Wine draws out the Emetick virtue of the *Regulus* much better than Water or Spirit of Wine, or Vinegar can do; the reaſon of which is, that this virtue does conſiſt in a ſaline Sulphur which Water could not penetrate; Spirit of Wine indeed does diſſolve ſome of the more ſulphureous part of it, but does not take enough of the Salt; the

the Vinegar by its acidity does fix too much what it has dissolved; but Wine contains a sulphureous Spirit, and a saline Tartar, which do make a most convenient *Menstruum* to dissolve and to preserve the saline and sulphureous part of the prepared *Antimony*.

Upon considering the different ways of evacuation caused by *Antimony*, and many other Medicines, I do find it very probable, that Emeticks do work as they do, because their operation being quick is exerted in the stomach, before the medicin had time to descend more downwards, and then this *viscus* is very sensible when irritated, and undergoes commotions sufficiently violent to discharge what is within it. But if the medicin proves slow in its operation, and descends into the guts before it raises a purgative fermentation, it then forces downwards; whence it comes to pass that those who do not vomit upon taking Emeticks, are commonly purged by stool.

Thus Vomits and Purges do differ only in this, that the first do work in the stomach, the others in the guts.

Oil, and lukewarm water do vomit, by relaxing the fibres of the stomach, and changing the motion of the spirits which do then act only by shaking, or turning the stomach to a discharge upwards.

If by way of curiosity you would Calcine four ounces of the *Regulus* of *Antimony* powdered, in an earthen cup unglazed, set in a small fire, stirring it all the while with a *Spatule*, there will rise up a vapour for an hour and a halfs time, or thereabouts, and when the matter fumes no longer, it turns into a grey powder, that weighs two drachms and a half more than the *Regulus* did at first.

*Calcination
of Antimony
and its
augmentation.*

S 2

This

This augmentation of quantity is the stranger, for that the fume which ascended from it during the Calcination, should seem rather to have diminished its weight. It must be therefore granted, that a great many fiery particles have entred into it, in the room of that which fum'd away.

This Fume proceeds from some grosser Sulphur, that remained in the *Regulus*, and indeed it smells strong of the Sulphur.

Another way of making the Regulus of Antimony.

THIS Preparation is a purification of *Antimony* more exact than the former.

Powder *Antimony*, *Tartar*, and *Salt-peter*, of each forty eight ounces, and mix them together put the mixture in a great earthen pot unglazed, or into a great Iron Mortar, set it within the Chimney, and touch the matter with a piece of burning Charcoal, which you must presently draw away again: upon this it will flame, and send forth some gross fumes. When it is quite burnt out, beat it into powder, and put it into a Crucible, in a melting Furnace: cover your Crucible, and heap about it kindled coals, and so continue a great fire till the whole matter be perfectly dissolved; then shake the Crucible, and take the fire from it, that it may cool, break it, and you will find your *Regulus* at the bottom, which must be separated from the dross by the Hammer. When this is done, wash it in water, and use it. There will be eleven ounces of it. It hath the same Vertues as the former, and it serves to the same uses.

Remarks.

Weight.
Vertue.

Remarks.

This method is to be followed, when one would make a considerable quantity of the *Regulus of Antimony* at once. The *Tartar* and *Salt-peter* being joyned with *Antimony* here, in greater quantity than in the former Operation, therefore the detonation is greater, because the *Salt-peter* is more proportioned to the *Sulphur*. The detonation of this Regulus is greater than the other.

The Pot or Mortar must be large, because the matter is very much rarified in the detonation. I burn it thus to evaporate a quantity of the Volatile part, that the rest may take up less room, and be more easily managed in the Crucible.

You must carefully observe whether the matter be well dissolved before you remove this fire from about the Crucible; for if it be not, the *Regulus* will be mixed up and down with the dross, and you will be put to the trouble of melting it over again. To be therefore sure, it is fit, now and then, to uncover the Crucible, and to dip an Iron slice into the very bottom, to try if all be melted. The Crucible is shaken to make the *Regulus* (which is the weightiest part) to precipitate to the bottom.

The matter, when dissolved, may be poured into a greased Mortar, which is also beat upon the sides for causing the *Regulus* to fall down to the bottom, as I said in the other Operation. But it is better to keep it in the Crucible, because in removing the Crucible from the fire it may chance to break, and the matter to be lost in the Furnace; for it being very weighty, the Pincers or Tongs do very often let it slip.

S 3

There

Figures
upon the
Regulus of
Antimony.

There is a less quantity of the *Regulus of Antimony* got this way than by the former; the reason hereof is, That there is more *Salt-peter* and *Tartar* used, which do purifie it better; and for this cause also it is fairer and more bright. There is commonly to be seen upon this *Regulus* a kind of Star, or figures of branches, or other irregular figures, which are caused by the Natural Crystals of *Antimony*, which are now purified, and do therefore appear better than they did before, as I shall shew when I come to the *Regulus of Antimony* with *Mars*.

It is fit to wash the *Regulus of Antimony* for cleaning it from some small dross which still sticks to it. There is less difficulty in shaping our Cups or Goblets of this *Regulus* than of the former, because being better purified it is therefore harder and more like a Metal. But however, we shall find it easier with the *Regulus of Antimony* with *Mars*, as I shall shew afterwards.

Weight of
the dross.

There is taken from this *Regulus* forty five ounces of dross which is a little more yellowish than the other: It may serve to make the *Golden Sulphur*. There is lost in the Detonation and melting fourscore ounces of matter, viz. The Spirit, the Oil of *Tartar*, all the Volatile part of *Salt-peter*, and a great part of the Sulphur of *Antimony*; for the dross contains only the fixt and saline parts of *Tartar* and *Salt-peter*, which becoming Alkali by the fire, do dissolve and preserve a part of the Sulphur of *Antimony*. When this dross is left in a moist place, it becomes of a yellowish red colour, because as the Salts moisten, the Sulphur of *Antimony* does appear. If the fingers touch this dross, they will smell of it many days.

Golden

Golden Sulphur of Antimony.

THIS preparation is the sulphureous part of *Antimony* dissolved by Alkali salts, and precipitated by an acid.

Take the dross of the *Regulus* of *Antimony*, powder and boil them with common water in an earthen pot half an hour; strain the liquor and pour Vinegar into the expression, there will precipitate a red powder; filtrate and separate your precipitate, dry it and keep it; you will obtain *Vermilion*. twelve ounces, and two drachms of it, it is called the Golden Sulphur of *Antimony*, and is an *Emetic*: the dose is from two grains unto six in broth *Dose*. or in Pills.

Remarks.

You must put about sixteen pints of water to boil with the fifteen ounces of the dross of *Regulus* of *Antimony*, though the liquor does coagulate like a Jelly when it is cold, by reason of the salts and sulphurs joining together; for the dross of the *Regulus* is nothing but a mixture of the six parts of Salt-peter, and Tartar, that have retained with them some of the more impure Sulphur of *Antimony*. *What is the dross of the Regulus.*

Now seeing that these salts do become *Alkali* by means of Calcination, the acid which is poured upon them, does break or destroy their strength, and makes them quit the sulphur which they held dissolved, from whence the precipitation of the Golden Sulphur of *Antimony* does proceed.

The Sulphur
very sink-
ing.

So soon as Vinegar is poured on the dissolution of the dross, volatile sulphurs do arise which are very disagreeable to the smell; the precipitate which is afterwards made, is like to a *Coagulum* or curd, in great quantity.

If you boil an ounce of the powdered dross of *Antimony* in a pint of Water, and then leave it to cool, without stirring it, it will turn into a *coagulum*, like to blood in a Skillet, but yet not altogether so red. This colour ariseth from the Sulphur of *Antimony*, dissolved by the Salts of *Tartar* and *Salt-peter*, which are rendred *Alkali* in the Calcination. This Operation is very much like what is done in Sanguification, as I shall shew when I come to speak of the *Magistery* of common Sulphur.

Golden sulphur taken from the dross of the second *Regulus*.

Golden Sulphur may be taken from the dross of the second *Regulus* of *Antimony*, by following the same method. It has the same vertue, but there is no need of using so much water, because there is not so much Sulphur remaining in the last dross as in the other, the detonation having evaporated much of it. This dross makes no *Coagulum* as the former when it is boiled in water, because the *Alkali* Salt, which is there in greater quantity, dissolves the Sulphur perfectly.

This Sulphur does operate much like to the *Crocus metallorum*, of which I shall soon speak. The Chymists have called it *Golden Sulphur*, by reason of its colour, which is near like unto that of Gold; but it is probable that the Ancients did understand by the *Golden Sulphur of Antimony*, some other sulphur than this, for they give it a diaphoretick vertue, whereas this is Vomitive; and what confirms this is, because almost all of them

them have writ, that there was a gross superficial sulphur in Antimony, like unto common sulphur, which is this of which our present preparation is made, and another more fixt, and like unto that of Gold, which they held to be Sudorifick.

You must not imagine that our Golden Vomitive Sulphur is altogether Pure, it is still loaded with a great deal of earth and salt, which it has still retained in the precipitation; and it is this salt which by rarifying its parts does give it this colour.

Regulus of Antimony with Mars.

THIS preparation is a mixture of the more fixed parts of Antimony, and some portion of Iron.

Put eight ounces of small Nails into a great Crucible, cover it, and set it on a grate in a Furnace; surround it above and below with a good fire, and when the Nails are red hot, throw into them a pound of Antimony in powder; cover again the Crucible, and continue a great fire; when the Antimony shall be in perfect Fusion, cast into it by little and little three ounces of Salt peter, a detonation will happen, and the nails will melt; and when there do rise no more sparkles, pour out your matter into a Cornet or Iron mortar, that you shall have greas'd with a little Suet, and heated before-hand: then strike the sides of the mortar with pincers, to make the *Regulus* fall to the bottom; when it is cold, separate it from the dross with a hammer: melt it in another Crucible, and cast into it two ounces of Antimony in powder;

der; when it is melted, add to it by little and little three ounces of Salt peter, which being burnt, and the matter casting forth no more sparkles, pour it into the Iron Corner greased and heated as before, then strike it with pincers, that the *Regulus* may fall down, and when it is cool, separate it from the dross as I have said; repeat melting the *Regulus* twice more, and each time cast Salt peter into it, but the last especially; you must observe to melt it well, before you cast the Salt peter into it, that the *Star* may appear. There is no need of adding any more crude Antimony to the two last Fusions. This *Regulus* is used as the other, and hath the same effects.

Virtue.

Remarks.

The Iron in the first Fusion mixing with the Antimony turns almost all of it into dross, because it joyns with the more impure Sulphur, so that the Reguline part being more weighty falls down to the bottom. Salt peter is used in order to open the Antimony, and cause a more perfect Fusion, that a separation of the grosser parts may be made the better. Moreover it carries off some Sulphurs by its volatile parts. The dross then does consist of Iron, Sulphur and fixt Salt peter.

The Fusion is repeated three times over, because some portion of Iron doth always precipitate with the *Regulus*; and a little crude Antimony is added to the first of all, to the end the *Mars*, which easily joyns with Antimony by reason of a gross Sulphur it contains, may leave the *Regulus* and stick to it. The two last Fusions do make a grey or white dross, and this is a mark, that the Salt

Salt peter can receive no more.

After the first Purification, ten ounces of *Regn-Weight*.
lus, and thirteen ounces of *Scories* do remain ;
after the second *Purification*, nine ounces and a
half of *Regulus* do remain ; after the third, eight
ounces and two drachms of *Regulus* ; and after
the fourth you'll have seven ounces, and six
drachms.

The Star which appears upon the *Martial Re- Whence the*
gulus of Antimony when it is well Purified, has *Star of the*
given occasion to the Chymists to reason upon the *Regulus*.
matter ; and the greatest part of these men being
strongly perswaded of the *Planetary Influences*,
and a supposed correspondence between each of
the Planets, and the Metal that bears its name,
they have not wanted to assert, that this same
Star proceeded from the impression which certain
little bodies flowing from the Planet *Mars* do
bestow upon *Antimony* for sake of the remaining
Iron that was mixed with it ; and for this reason,
they wonderfully recommend the making this
preparation upon *Tuesday* rather than another day,
between 7 and 8 a clock in the morning, or else
between 2 and 3 in the afternoon, provided the
weather be clear and fair, thinking that day which
is denominated from *Mars* to be the time that it
lets fall its *Influences* most plentiful of any. They
have likewise conceited a thousand things of the
like nature, which it would be too much trouble
to relate here.

But all opinions of this kind have no manner of
probability, for no bodies Experience did ever
evince, that the Metals have any such correspon-
dence with the Planets, as I have maintained
elsewhere ; much less can they prove that the
Influences

Influences of the Planets do imprint such and such *Figures* to Metals, as these men do determine. It would be no hard matter for me here to shew how little reason or foundation there is in discourses of that nature, and how very weak and uncertain are the Principles of *Judicial Astrology*; but this would be too long a Digression for this place, and serve only to swell this Book with things that may be found treated of at large elsewhere, and particularly in the *Epitome of Gassendus* made by Monsieur *Bernier*.

My thoughts therefore shall not soar so high as these men do; and though I may seem dull and mean in their eyes, I shall not search into the *Celestial Bodies* for an explication of the *Star* we now contend about; seeing I can find it out in causes near at hand. There have been who gazing too earnestly upon the Stars above, have not perceived the stone at their feet, that caused them to stumble.

I say then that the *Star* which appears upon the *Martial Regulus of Antimony*, does proceed from the *Antimony* it self; for this Mineral runs all into Needles; but because before it is Purified, it is loaded with sulphureous and impure parts, which do make it softish, these Needles do not appear but confusedly. Now when it is purified with *Mars*, not only a great many of the more sulphureous parts of *Antimony*, and such as are fittest to hinder its Crystallization, are carried away, but also there remains the hardest and the most compact part of Iron, which makes the *Antimony* firmer than it was. So that the Purification does serve to lay open the natural Crystals of *Antimony* in form of a *star*, and the Iron by its hardness does expatiate

expatiate these Crystals, from whence it comes that the *Martial Regulus of Antimony* is harder than the other *Regulus*.

The Crystals then do appear in form of a *star* in the *Martial Regulus of Antimony*, because they were so naturally in the *Antimony* before. This *star* does not appear exactly the same in the *common Regulus of Antimony*, let it be Purified never so much, because its parts have not the same tension as those of the other.

Cups and Goblets may be made of this *Regulus* *The Martial- of Antimony* with *Mars* more easily than any other *Regulus*, because it contains some Iron: *at Regulus best for* for this metal mixing with the hardest part of *Cups.* *Antimony*, renders it less brittle, and consequently more capable to be beat out.

The Cordial of Poterius.

THIS Operation is the *Regulus of Martial Antimony*, fixed and mixed with Gold.

Take of the *Regulus of Martial Antimony* four ounces, of the fine powder of Gold half an ounce, and twelve ounces of *Salt-peter*. Powder the *Regulus* and the *Salt-peter* together, and then mix them carefully with the Gold; set a Crucible in a Furnace amongst burning Coals; and when it is red hot, cast into it a Spoonful of the mixture, which will make a small detonation: when that is past, throw in another, and continue so doing, till all the matter be in the Crucible: Then leave it to Calcine the space of an hour, and pour into it much hot water, and let all steep together for some hours till the

Salt-peter

Salt-peter be dissolved, pour off the water by inclination, and wash the powder which is at the bottom several times, and thereafter dry it in the Sun or shade, and Calcine it again in a new Crucible for an hour, stirring it with an Iron Spatule, and so the Operation is ended. Keep this matter, which is called the Cordial of *Peterius*.

Vertue. It is esteemed good for strengthening the Stomach and Heart, for repairing decay'd Nature, for exciting the transpiration of corrupt Humors, for purifying the Blood, for expelling Poison, stopping the Hemorrhagies, for the Palsie, and diseases occasioned by *Mercury*. The Dose is from six grains to thirty.

Dose. If the Lotions be evaporated, there will remain a Salt, which has almost the virtues of the *Sal Polychrest*.

Salt of the Lotions.

Remarks.

In this Operation one may use the Gold of *Departz*, which being powdered does mix easily with other matters.

There is as much *Salt-peter* used as is necessary to fix the saline Sulphur of the *Regulus of Antimony*, that it may not be capable of exciting a vomiting.

The detonation which happens when the matter is cast into the red hot Crucible is not very great, because the volatile part of *Salt-peter* has but little of the Sulphur of the *Regulus* to mix and rise with it.

The fixed Mass is also calcined for an hour, that the *Salt-peter* may have time to penetrate all

all the particles of the *Antimony*, and fix them.

The Lotions dissolve the loose and superficial *Salt-peter*, which also contains much volatile, but they cannot carry off what is closely mixed with the *Antimony* and fixes it.

The last Calcination of the washed powder serves only to deprive the *Antimony* of some sulphureous volatile particles which may be remaining in it, and to drive the composition.

The Gold which is used in this preparation is only upon the account of diseases occasioned by *Mercury*, for it can have no effect upon the rest.

Glass of Antimony.

THIS preparation is a *Regulus of Antimony* become vitrified by a long fusion.

Calcine in a small fire a pound of *Antimony* in powder, in an earthen pot unglazed, stir the matter continually with an Iron Spatule, until vapours arise no longer; but if notwithstanding your stirring, the powder should chance to run into lumps, as it often happens to do, put it into a mortar and powder it; then Calcine it again, as I have said, and when it will fume no more, and is of a grey colour, put it into a good Crucible, cover it with a tyle, and set it in a wind-furnace, in which you shall make a very violent coal-fire round about the Crucible, to the end the matter may melt. About an hour afterwards uncover the Crucible, and putting the end of an Iron rod into it, see whether the matter that sticks to it is become Diaphanous; and if it be, pour it upon
a Marble

use. a Marble well warmed, it will congeal, and you'll have the *Glass of Antimony*, which you must let cool, and so keep for use. It is a strong Vomitive, and one of the most violent that is made of *Antimony*. The *Emetick Wine* is made of it, by setting it to steep in White-wine. It is given also in substance from two grains unto six.

Syrup Emetick.

An *Emetick Syrup* is prepared with the *Glass of Antimony* infused in the juice of Quinces, or Lemons, and Sugar. If instead of these acid juices, one should use Wine, the Syrup would be the more Vomitive. The Dose of the one and the other Syrup, is from two drachms to an ounce and a half, and is given especially to nice persons, and to Infants.

Dose.

Remarks.

The *Antimony* must be Calcined within the Chynny, and the vapours that fly from it must be avoided as being very injurious to the Breast.

This Calcination is performed to devest it of some gross Sulphurs that might hinder its Vitrification. Some do add to this gray powder *Borax*, others crude *Antimony*, and others Sulphur, that it may vitrifie more easily.

The Vitrification happens not, until the parts of *Antimony* have been rendred more firm and stiff than they were before, to the end the fiery particles passing and repassing through the matter may form the pores into a strait line, so that they can remain in this condition, when the *Antimony* is grown cold; and it is the figure of these pores, which causes the transparency, because they suffer the light to pass through them directly.

The

The Sulphur and *Antimony* do help it to melt, wherefore some do add them to the matter, though in a small quantity, and their volatile part flies away before the Vitrification.

The *Borax* does not only help the fusion, but likewise serves to harden the matter when cold, that the pores may the longer be preserved strait; for, although a great part of the sulphurs of *Antimony* flies away, yet there remains enough still in the very substance of the glass, which yet do not very long continue in their first position, but shutting the pores of the matter do render it opaque.

This accident does not happen to such glasses as contain no Sulphur, because their parts being always preserved stiff and firm, their pores do never become obstructed.

Sulphur hinders the Vitrification by its soft and grasping parts, which being in motion stop the pores, and so confound them that the light is hindered from passing.

Glass of Antimony receiving more Calcination than the other preparations, should consequently be less Vomitive, by reason of the dispersion and loss of much Sulphur, wherein its Vomitive vertue doth consist: Nevertheless experience shews us the contrary, for it works with more force, as I have said; and the reason of it is, because no Salt is used in the making of this glass, whereas in the other preparations Salt-peter is used, which by its fixt parts hinders the activity of some part of the Sulphurs; thus although there doth remain but a small quantity of Sulphur in the *Glass of Antimony*, yet as little as there is being in great motion, it causes a greater disposition to Vomit.

The

Correction
of the Glafs
of Anti-
mony.

The *Glass of Antimony* may be corrected by Calcining it in a Crucible with a third part of Salt-peter, then washing it divers times with hot water, it is to be dried. This powder is not so strong in its operation as the *Glass of Antimony*, because the Salt-peter has fixed some part of the Sulphurs of *Antimony*. It works much like the *Crocus metallorum*, of which I am to treat.

Liver of Antimony, or Crocus Metallorum.

THIS preparation is an *Antimony* opened by Salt-peter, and by fire, which have made it half glass, and which have given it a Liver-colour.

Take a pound of *Antimony*, and so much Salt-peter, powder them, and mix them well together, put this mixture into an Iron Mortar, and cover it with a tyle; leave an open place nevertheless through which you may convey a coal of fire, and take it out again, the matter will flame, and cause a great detonation, which being over, and the mortar grown cold, strike against the bottom that the matter may fall down; then separate the dross with a hammer, from the shining part, which is called *Liver of Antimony* from its colour.

Dross.

Emetick
Wine.

To make the *Emetick wine* you must infuse an ounce of this *Liver of Antimony* in powder in a quart of white Wine four and twenty hours, and so let it settle; the Dose of this Wine is from half an ounce to three ounces.

Crocus
Metallo-
rum.

That which is called *Crocus Metallorum* is nothing but the *Liver of Antimony* washed several times with warm water, and afterwards dried. It is used

used as the *Liver of Antimony* to make the Emetick wine, and it is given likewise in substance to Vomit strongly: the dose is from two to eight grains. *Dose.*

Remarks.

This preparation is a more impure *Glass of Antimony* than that I described, and consequently it is more opake; it works not so violently as the glass.

The *Liver of Antimony* hath a different strength according to the proportion of *Nitre* that enters into it; when there's more *Nitre* than *Antimony*, it is the less Vomitive, not only because great store of the Sulphurs of *Antimony* are lost in the strong detonation that it raises, but also because there remains more fixt parts of the *Salt-peter*, which do joyn and unite with the Sulphurs that remain in the matter. Thus if instead of a pound of *Salt-peter* you should use twenty ounces, as many do, you'd have a *Liver of Antimony* less Vomitive than that I described. Now on the contrary when less *Salt-peter* than *Antimony* is used, the *Liver* that proceeds from this mixture is not so Vomitive as that I now described; the reason of it is that the Sulphurs of *Antimony* have not been sufficiently stirred by the *Salt-peter* in so little a quantity: for *Antimony* becomes not Vomitive, but only when it hath been sufficiently opened, either by fire, or some Salts. The most convenient proportion then that can be observed to render the *Liver of Antimony* as Vomitive as may be, is to take equal parts according to my description.

The strong detonation that happens when fire is put to the matter, is not caused through the *flam-*
T 2 *gration*

The Liver of Antimony is strong according to the quantity of Nitre it receives.

Salt-peter not inflammable.

gration of Salt peter, as almost every body hath thought, through want of sufficient reflexion; I shall prove in its proper place that it can never take flame, and that its volatile parts do serve for a kind of Bellows, or Vehicle to rarifie and exalt the Sulphurs of Antimony.

Magnesia
Opalina

A *Liver of Antimony* is prepared with equal quantities of Antimony, Nitre and Sea salt decrepitated; and because these salts do give it a red colour like unto the *Opale*, this preparation has been called *Magnesia Opalina*; it is less Emetick than the other, by reason of the addition of sea-salt, which fixes the saline Sulphur of Antimony.

Several other ways of preparing the *Liver of Antimony* have been invented; but I am contented with having given you the best of all, and the easiest to prepare.

If you use ordinary Salt-peter in this Operation, you'll obtain eight ounces and two drachms of *Liver of Antimony*; but if you use purified Salt-peter, you'll get but six ounces and a half.

This difference of quantity proceeds from the nature of Salt-peter, for the more volatile parts this Mineral salt contains, the more apt it is to carry off some parts of the Antimony. Now purified Salt-peter is much more volatile than the common sort, wherefore the *Liver of Antimony*, where it is used, is in lesser quantity.

The *Liver of Antimony* that's made with common Salt-peter is the redder, and comes nearer to the colour of an Animal Liver, than that which is made with purified Salt-peter; this happens through the fixt salt which is in this preparation more than in the other; for common Salt-peter contains much fixt salt, as I shall shew in its proper

per place; this salt does likewise make the matter the heavier.

As for the virtues of these *Livers of Antimony*, the difference is not very great, but only that which is made with purified Salt-peter is a little more Emetick than the other.

I cannot pass by here the false imagination of some men who think that preparation of the *Liver of Antimony*, of which half a drachm, or two scruples may be given, is much better than that whereof 3 or 4 grains perform the same effect; for there is no doubt but the taking so great a quantity of Antimony will give an impression to the stomach, that a lesser quantity is not able to do. Furthermore, whereas these kind of preparations do commonly open the Antimony but little, or but half-fix the saline sulphurs, it is to be feared lest some salt they may meet with in the stomach, should open them too much, or volatilize them, and so cause most unhappy accidents.

Too great a Dose of the Liver of Antimony is dangerous.

When the *Liver of Antimony* is washed with warm water, some part of the fixt *Nitre* that remained in it is separated. Many have believed that the more violent part of the Emetick was carried off by this Lotion: but on the contrary, this fixt part is more capable of mitigating than augmenting its violence for the reasons I have spoke already.

The Liver of Antimony is more Vomitive by washing.

You must observe that if you should put four ounces of prepared Antimony into a quart of wine, the wine will not be more Vomitive than if you should put but an ounce; because being loaded with as much of the substance of it as it is able to contain, the rest remains at bottom, and cannot be dissolved unless more wine be added.

T 3

Now

The Liver
of Anti-
mony
serveth to
make the Eme-
tick wine
many times.

Now an ounce of *Crocus Metallorum*, or Liver of Antimony is, according to experience, capable of impregnating not only one quart of wine, but after having poured off the liquor by Inclination, if you put as much more wine to the matter that remains, and leave it in digestion two or three days together, you'll have an Infusion as Emetick as the first. You may if you please renew the wine that is poured upon it to be infused, nine several times, and it will always prove Emetick; after which, if you Calcine your matter a quarter of an hour in an earthen pot unglazed over a small fire, stirring the matter continually with an Iron Spatule, you may infuse it again as before, and it will render the wine Emetick.

Many Physicians and Apothecaries are possessed with a fancy, that this *Crocus Metallorum* never loses its vertue by Infusions, but that it can serve even fifty times, if there be occasion for it. But they are very much deceived; for after eight or nine infusions, the Emetick wine will not be so strong, and still it loses its vertue the more are made, because the loose Saline and Sulphureous particles being dissolved in the first infusions, there is not sufficient matter for the rest; and therefore very often the wine has been drawn off with very little of Emetick quality. For this reason some have been obliged to give six ounces of Emetick wine to make one Vomit: and tho' it has sometimes been believed, that the strength of ones constitution required so much, yet it is rather to be attributed to the weakness of the Remedy.

This circumstance makes some think, that a great Dose of Emetick wine does not work longer, nor

nor more violently, than a small one, because all is vomited up again in the beginning of the operation: but experience shews the contrary every day: and we have seen very dangerous accidents, by giving too much of this remedy in one Dose, upon this ill-grounded supposition.

These abuses in Physick are very important; for if the Emetick wine, which the Apothecaries keep, be sometimes strong and sometimes weak, the Physicians cannot have any certainty of the effect of what he prescribes.

That Emetick wine which is made with the *Crocus Metallorum* is most in use; it is likewise prepared with the *Regulus* and glass, as I have said, speaking of them.

You might likewise make another sort of it, by infusing warm some days crude Antimony in white-wine; for the tartarous salts of the wine do open the Antimony, but it would not prove so vomitive as the other.

The Emetick wine is given alone, or mixed with Purgatives, that convey it partly by stool. When you find an Inclination to vomit, you must be provided of broth a little fat, and take some spoonfuls to facilitate the Vomiting, and hinder the great efforts which sometimes break vessels, and cause mortal Hemorrhagies to follow. You must also consider that those who have their breasts strait, and bodies thin, are much harder to vomit than others. But let us leave those particulars to the wisdom of Physicians.

*Cautions to
be observed
in Vomiting.*

Magistery or precipitate of Antimony.

This operation is a Calcination of Antimony by *aqua Regalis*. Put four ounces of Antimony finely powdered into a large Matraſs, pour upon it ſixteen ounces of *Aqua Regalis*: ſet the Matraſs in ſand, within the Chimney, and put under it a ſmall fire of Diſtillation, which will cauſe a conſiderable Ebullition with red vapours, that ought to be avoided: continue the diſtillation till all the *Antimony* be reduced into a white powder, at the bottom of the Matraſs, which commonly happens in ſeven or eight hours. Fill your Matraſs with Fountain or common water, and pour the liquor (before it be ſettled) into an earthen veſſel: the white powder will run off with the water, and you will ſee at laſt a yellow powder which muſt be kept apart. Then pour your white liquor, by little and little, into a Tunnel, lined well with brown paper, the water will paſs through, and leave the white powder in the filter: waſh it afterwards ſeveral times, untill the water be inſipid, and then dry this powder, and keep it.

Virtue.

It commonly purges rather downwards than upwards, but yet at ſome times cauſes a gentle vomiting, and often it only excites a ſweat. It is good in Hypochondriacal Diſtempers, the Apoplexy, and Palsy: and when it is neceſſary, to diſcuſs thick humours. The Doſe is from four grains to twelve in ſome proper liquor.

Deſc.

If by way of curioſity, you pour the water, which contains the yellow powder, into a Tunnel, lined with brown paper, as was ſaid before, you

you may separate a powder which is no other thing but Sulphur: wash it and dry it, it will take fire as soon as common Sulphur, and hath the same vertues,

Remarks.

Neither the Spirit of Nitre nor *Aqua fortis* work upon *Antimony*; therefore *Aqua Regalis* is necessary to dissolve it: The reason which may be given for this is, That the pores of *Antimony* being great, and its substance soft, because of its having much Sulphur, the points of the Spirit of Nitre are too fine to cut its parts as it ought to be: it is necessary to have some courser Knives for this, like the points of the *Aqua Regalis*.

When there is no common *Aqua Regalis*, you may add to the Spirit of Nitre, or to *Aqua fortis*, about a sixth part of good Spirit of Salt, and this way you shall have an *Aqua Regalis*, which worketh as well as the other.

How to make Aqua Regalis presently.

A large Matrafs is necessary, lest the matter, which is considerably rarified, should run over. The dissolution may be made without fire, but then it would be longer in doing. The vapours ought to be avoided, because they are hurtful to the breast.

There is no true dissolution here, but only a division of the parts of *Antimony*, which the *Aqua Regalis* cannot bear up, because they are in too gross heaps: It only sustains a small quantity which precipitates when the water is poured into the Matrafs. The white colour is caused by the order and disposition which the acids give to the parts of this matter, which reflect the light on all sides: Whereas crude *Antimony* is black, because

cause its pores are disposed to imbibe the light, and not to reflect them back to our eyes. Every time that *Antimony* is well rarified by acids it becometh white, as may be observed in the several operations which follow.

When *Antimony* is reduced into a white powder, the *Aqua Regalis* worketh no more upon it, because this powder is already as much separated as can be. It is also mixed with the points of the *Aqua Regalis*, which fall with it. Common water, when poured into the Matrafs, takes off those that are more loose, but there always remains some. They serve to fix the *Antimony* in some manner, and to render this powder a gentle remedy.

You may make use of the *Regulus* of *Antimony* instead of crude *Antimony*, the powder should be a little whiter, but not better. If the *Regulus* of *Martial Antimony* be used, there will not be so much whiteness, because of the Iron. There is no Sulphur when these *Reguls* are used, because the preparation of them purified them from their grossest Sulphur.

This powder hath different Effects, according to the different Temperaments, and diverse dispositions, when it is used: for very often a Remedy, which makes a Person vomit at one time, purges him by Stool at another: and it is often seen, that Vomitives only procure Sweat.

Some calcine this powder in a Crucible until it be Red, which only serves to the same use, but then the Dose must be from two to six Grains, because the Calcination having deprived it of the acids of the *Aqua Regalis*, which fixed its parts, it becomes more vomitive than before.

Antimo-

Antimonium Diaphoreticum.

THIS preparation is an *Antimony*, whose sulphurs are fixed by *Salt-peter*, and are thereby hindered from working otherwise than by sweat.

Powder and mix well together one part of *Antimony* with three parts of purified *Salt-peter*; and having heated a Crucible red-hot in the Coals, cast into it a spoonful of your mixture, you'll hear

a noise or detonation; after that's over, cast in another spoonful, and continue to do so till all your powder is in the Crucible. Leave a great fire about it two hours; then throw your matter which

will be white, into an earthen pan almost filled with Fountain-water, and leave it steeping warm ten or twelve hours, that the fixt *Salt-peter* may dissolve in it; separate the liquor by Inclination, wash the white powder that remains at bottom five or six times with warm water, and dry it.

This is called *Antimonium Diaphoreticum*, or mineral Diaphoretick, or the *Calx* of *Antimony*.

This Preparation is esteemed good to procure sweat, and to resist Poison, and consequently is good in Malignant Fevers, the small Pox, the Plague and other Contagious diseases. The Dose is from six Grains to thirty, in some appropriate liquor.

All the Lotions may be evaporated, and a fixt *Salt-peter* will be found at the bottom of the vessel, which works much like the *Sal Polychrestum*.

The *Sal Polychrest* may be called *Stibial*, or the Salt of *Antimony*; for it is a *Salt-peter* calcined, and partly fixed by the Sulphur of *Antimony*. It contains

Detonation.

Mineral
Diaphore-
tick, or
Calx of An-
timony.

Virtue.

Dose.

contains a little *Diaphoretick Mineral*, which is dissolved in it.

Remarks.

In this Preparation three pounds of *Salt-peter* are used for one pound of *Antimony*, that after sublimation of the volatile parts there may remain store of fixt *Nitre*, which unites with the *Antimony*, and hinders it from being Vomitive.

It is observable, that three parts of *Nitre* with one of *Antimony* do not cause so strong a detonation, nor so great a diminution of the parts of *Antimony*, as when there are but equal quantities. And the reason of it is, that there's too little sulphur of *Antimony* for the quantity of *Nitre*, and that some part of the sulphur does remain unactive in the fixt *Nitre*, which admits of no flagration, for the volatile part of *Salt-peter* does not burn, but according to the proportion of sulphur with which it is mixed. And this is a proof of my assertion in this matter, that if you throw upon lighted coals, a little of that *Salt-peter* which you shall have drawn from the lotions of *Antimonium Diaphoreticum*, it will still cause a flame to arise, by reason of new sulphur which it meets with in the coals, which sulphur does joyn together with the volatile part of *Salt-peter* that remained. I shall speak more at large of the flagration of *Salt-peter*, in the Chapter of this Salt.

You must put the mixture into the Crucible spoonful after spoonful, that the Calcination may be done the better. When it is ended, the matter is washed, for to separate the *Salt-peter* that is unuseful. But let there be never so many lotions,

tions, they can never wash away a certain enveloping or cover that is given to the *Antimony* by the fixt *Salt-peter*; for each particle of *Antimony* is so closely united, that it cannot any way be separated without recourse to some reductive Salt; and this is it that makes this preparation of *Antimony* to be not at all Vomitive. Many do say it is Sudorifick, but I could never observe any such effect sensibly. Nevertheless I would submit to think so, both because many Authors have written so, and because the heat of the body may possibly separate some of its Sulphurs, which not being strong enough to make one Vomit, may only drive by Transpiration sensible or insensible, according as the pores are more or less open. Others do think *Antimonium Diaphoreticum* is meerly an alkali, that is good for nothing but to destroy acids, and on this principle do give it for the same ends as Coral, Pearl, Calcined Harts-horn, and such like things as do absorb sharp or acid humors, which abounding too much in the body do cause diverse diseases; but without doubt they that follow these principles have not built them on Experience; for pour any kind of acid on *Antimonium Diaphoreticum*, it will never dissolve at all, and take away the acid after a very long Infusion, it will be as strong as ever; which proves it to be no alkali, and therefore not to produce the effects that are pretended.

Antimonium Diaphoreticum is with some an alkali.

If instead of crude *Antimony*, you take the Regule of *Antimony* for making this Mineral Diaphoretick, the detonation will be very small, because the Regule has not enough of Sulphur to mix with the *Salt-peter*, and to force its rising with it in such a rapid manner. The *Antimony*

Diaphoretick,

Diaphoretick, which is made thus, is whiter than the other.

Cornachine powder.
Dose.

The *Cornachine Powder* is made of equal parts of *Antimonium Diaphoreticum*, *Diagride*, and Cream of *Tartar*. The dose is from 20 to 45 grains. They call this powder *Pulvis de tribus*, *Diagride Antimony*, or the Earl of *Warwick's powder*. It is very good to purge all sorts of humours. Some mix more of the *Diagride* than of the other Ingredients, to make it stronger; for all its purgative vertue comes almost from that prepared *Scammony*.

Another Antimonium Diaphoreticum.

THIS preparation is a Calcination of *Antimony*, by which it is fixed, and rendered fudorifick, without losing the volatile part which sublimes from it.

Aludels.

Take a good earthen pot unglazed, able to resist the fire, with a hole in the middle of its height, and a stopple to it; set it in a Furnace of an equal proportion, and fit to it three pots more of the same earth, all three open at the bottom, and fit a glass head to the uppermost pot, with a little Viol for a Receiver. Lute the junctures well, and by the means of some Bricks and Lute together, let the fire transpire only through some little holes, and be but strong enough to warm the bottom of the lowermost pot; then give your fire by degrees, to heat this pot by little and little red-hot.

In the meantime mix three parts of Salt-peter, with one of *Antimony* in powder; cast a spoonful of it into the red-hot pot through the hole, and stop

stop it again quickly, you'l perceive a great detonation, and after it is over, cast in another spoonful, and continue to do so untill all your matter is spent. Then encrease the fire to the utmost for half an hours time, and so let it go out. Unlute the vessels as soon as they are cold, you'l find a little Spirit of Nitre in the Receiver; white flowers in the three upper pots, and a white mass in the lowermost, which may be washed as the other *Antimonium Diaphoreticum*, and so dried. This Mineral Diaphoretick is as good as the former; you must wash the flowers several times with warm water, and then dry them. They are not so Emetick as those I shall describe hereafter; the Dose is from two to six grains.

*Spirit of
Nitre and
flowers of
Antimony.*

Dose.

Remarks.

In this preparation the volatile or Sulphureous parts of *Antimony* do stick to the sides of the pots like flower; if you don't wash them, they will not be so Vomitive, because the Salt-peter that rises with them, hinders their activity.

The acid spirit which is found in the Recipient may be used in the Colick; the dose is from four to eight drops in Broth, or some appropriate liquor.

Dose.

If you use in this operation five ounces of *Antimony*, and fifteen ounces of Salt-peter, you will draw half an ounce of the Spirit of Nitre, two drachms of flowers of Antimony washed, and dried, and five ounces of very white *Antimonium Diaphoreticum*, after that it is well washed and dried; and if you evaporate and crystallize the lotions, you will find ten ounces of Salt, which will be a Salt-peter

Weight.

peter half fixed, and which will flame being thrown upon the coals; insomuch that there will be lost in the whole of the mixture, four ounces and two drachms. This diminution comes from what loses through the hole of the pot, during the detonation, for stop it as well as you can, there will always vent out a great deal of fume, which will incommode the Artist, unless he takes care to turn away his head from the steam.

The purified Salt-peter loses no more than the other, because the sulphur of Antimony can take of the volatile parts of Salt-peter but such a proportion as it requires to raise it. So that in fifteen ounces of Salt-peter, (whether it be the purified sort or the common) there are much more volatile parts than are necessary, in order to joyn with the sulphur of five ounces of Antimony.

The Salt which is drawn from the Lotions of the *Antimony Diaphoretick* is a little Alkaline; for by the Calcination the fire opens the pores of the *Salt-peter*, sufficiently to make it susceptible of the impressions of an Acid.

Although there do rise a great many parts of Antimony with the volatile portion of Salt-peter in the detonation, yet we find that the *Antimonium Diaphoreticum* which remains, does weigh as much as the Antimony which was employed in the operation; the reason of which is that in place of the part of Antimony that exhales, a great deal of Salt-peter does as it were inseparably joyn with the remainder, and this is that which fixes it, and hinders it from being vomitive, as I have said.

Again, although Antimony is naturally black, it becomes altogether white, when it has been well rarefied; for all that we see in this operation, is a pure

pure white, as well the volatile as the fixt, which shews very well that colours have no real being.

An *Antimonium diaphoreticum* may be prepared, ^{Another preparation of Antimonium diaphoreticum.} and at the same time likewise a sulphur of Antimony; after the following manner.

Dissolve within the chimney, what quantity you please of crude Antimony with three times as much *Aqua Regalis*, in a glass body, there will appear a strong ebullition with red vapours, which must be avoided as being very injurious to the breast; when the dissolution is over, pour upon it a great quantity of water, in order to weaken the *Aqua Regalis*, upon which the whole turns into a milk, and then a Precipitate in a white powder falls to the bottom of the vessel.

You will likewise see a kind of grey scum swim upon the liquor, which you must gather up with a Spatule, or with a wooden spoon, and dry it in the shade; it is a sulphur which fires like common sulphur, and is good for nothing else.

You must decant the water from the body, and washing the precipitated powder divers times, and drying it, you will have an *Antimonium diaphoreticum* that may be used as the former; this preparation indeed is not much in use, but many do prefer it before all the others.

When Antimony is Calcined by the heat of the Sun, as through a Burning-Glass; instead of losing its weight, as one would think it should by reason of the evaporation of Sulphureous parts, it does increase in weight: which shews that some more ponderous bodies have succeeded in the place of those that are gone.

Flowers of Antimony.

THIS Preparation is the more volatile part of *Antimony* raised by Fire.

Fit the same pots I spoke of in the last Operation one upon another; set them in the same Furnace, and observe the same circumstances for their situation, and for heating the lowermost. When its bottom is red-hot, cast into it a small spoonful of *Antimony* in powder through the hole, and stir the matter at the bottom of the pot with an Iron Spatule crooked a little on purpose to do it the better; draw out your Spatule, and stop the hole, the flowers will rise and stick in the upper pots. Continue a great fire, that the pot may still remain red-hot, and when you see nothing more sublime, cast in so much more *Antimony*, observing to do what I have said. Repeat the casting it in through the hole, till you have flowers enough. Then let the fire go out, and when the vessels are cold, unlute them, you'll find flowers all about the three upper pots, and the head, gather them together with a Feather, and keep them in a Viol.

Virtue.

It is a powerful Emetick; it is given in Quartan Agues, and other intermittent Fevers, and also in the Epilepsie; the dose is from two grains to six in Lozenges, or Broth.

Dose.

Remarks.

In this Preparation, as in the former, you must leave room enough; otherwise the flowers of *Antimony* being driven fiercely by the fire, would be

be apt to break the vessel for want of room to move in. And this is the reason why many pots are here placed one upon another. There's no need of any Receiver, because there is no liquor to fall into it, so that a blind head may serve.

What remains at the bottom of the Pot is the fixed part of *Antimony*, which may serve for making the *Glass of Antimony*, when it is pulverized and calcined by a small Fire, until no more fumes arise.

If the *Flowers of Antimony* do happen to be of different colours, it is because the fire was not managed equally strong; these *Flowers* are more Vomitive than the former, because they have no *Salt-peter* in them.

Red Flowers of Antimony.

TH E S E *Flowers* are the more sulphureous part of *Antimony* rarified and exalted by fire.

Powder and mix well together four pounds of common glass with one pound of *Antimony*, put this mixture into an earthen, or glass Retort luted, whose half is empty; set it in a Reverberatory Furnace, and fit to it a large Receiver, lute the junctures lightly, and give a little fire at first to warm the Retort, then augment it by degrees, and you'll see *Red flowers* come forth into the Receiver: continue the fire until no more can come, which you'll know as you unlute the junctures; and taking off the Receiver gather your *Flowers*, and keep them for use. They are more Vomitive than the former, and are given to the

Dose. same intents: the dose is from two grains to four in a Lozenge, or some appropriate liquor.

Remarks.

That which makes these *Flowers* more Vomitive than the former, is the more terrestrious or fixt part of *Antimony's* being kept from rising by the glass, so that what is exalted by the fire is more Sulphureous, and consequently more Emetick.

The red colour of these *Flowers* doth proceed from the abundance of Sulphurs they are impregnated with, and it may be said that glass, which is an alkali, acting on this Sulphur gives it this colour after the same manner as Quick-lime, or the alkali Salt of Tartar makes common Sulphur turn red, when they are boiled together in water.

The time that you take these *Flowers of Antimony*, you must often drink broth, both to facilitate the vomiting, and dull the great activity of this Remedy; for it is one of the strongest vomits that is in Physick. But because it sometimes happens that this Powder sticking in the membranes of the stomach, or some of its folds, doth cause a continual vomiting, notwithstanding the frequent use of broths, you must then add the Cream of Tartar, and dissolve it in the broth, and so take some Spoonfuls every quarter of an hour. This Cream of Tartar stops the vomiting, because it joins with the Sulphurs of *Antimony*, and fixes them, so that they precipitate by stool.

Enter,

Butter, or Icy Oil of Antimony.

THIS Preparation is an *Antimony* rendred caustick by acids.

Powder, and mix six ounces of the *Regulus of Antimony*, with a pound of Sublimate Corrosive; put this mixture into a glass Retort, whose half remains empty; set your Retort in Sand, and after having fitted to it a Receiver, and luted the conjunctions, you must first make a small fire under it, and there will distil a clear Oil; after that, augment the fire a little, and there will come forth a white thick liquor like *Butter*, which would stop the neck of the Retort, and break it, if you did not take care to set live Coals near it, that it may melt and run into the Receiver. Continue the fire, until you see a red vapour come forth. Then take away the Receiver, and put another in its place filled with water. Encrease the fire by degrees, to make the Retort red-hot, and the *Mercury* will run into the water, dry it, and keep it for use as other *Mercury*.

The *Butter of Antimony* is a Caustick, it eats proud flesh, and cleanses Ulcers; the Powder of *Algarot* is made of it, as I shall shew hereafter.

Remarks.

Some time after the mixture of these two Ingredients, the matter becomes very hot, and the reason of it is, because the acid points of the *Sublimate Corrosive*, penetrating the parts of the *Regule of Antimony*, and dividing them violently,

U 3

do

do raise a heat, as it commonly happens, when an acid penetrates an Alkali, or when two hard bodies do rub strongly upon one another.

Butter of Antimony, what it is.

This *Butter of Antimony* is nothing but a mixture of the acid Spirits of *Sublimate Corrosive* with the *Regulus of Antimony*, and those Spirits are they that render it Caustick.

The Spirits of Salt and Vitriol in this Operation do leave the *Mercury* to adhere unto the *Antimony* which is more porous; insomuch that the *Mercury* being divested of that which kept it in a Crystalline form, and being driven by a strong fire, rarefies into vapours, which pass through the neck of the Retort into the Receiver filled with water, wherein it condenses into Quick-silver by means of the coolness.

Difficulty.

I doubt not but some will find difficulty in conceiving how the acids that adhered to the solid body of *Mercury* should strike off to joyn with the *Antimony*; but it may be said to that, That the acids being so many edges fastned at one end in the body of *Mercury*, may by t'other end be separated and drawn off by the soft and ramous parts of the *Antimony*, that are in greater motion than the *Mercury*.

Instead of *Regulus*, the Liver, or Glass of *Antimony* might serve if you please.

The *Regulus of Antimony* receives only such a quantity of the acids of the *Sublimate Corrosive* as is sufficient to fill its pores: Therefore there would be no more of this *Butter*, tho' you did put a pound of the *Sublimate* to six ounces of the *Regulus*: nor would it be any advantage to put more of the *Regulus* to that proportion of the *Sublimate*; for a part of it would remain in the

Retort.

Retort, without joyning the acids, and consequently without turning into *Butter*.

There may be got by this Operation eight *Quantity*. ounces and three drachms of the *Butter of Antimony*, twelve ounces of *Mercury*: and there will be in the *Retort* an ounce and a half of Matter, some black, some white, some red, which is the most Terrestrial and Sulphureous part of the *Regule of Antimony*, and which may be thrown away as useless.

That degree of fire, which is sufficient to extract the *Butter of Antimony*, is not strong enough for distilling the *Mercury*, and therefore it does not distil with the *Butter*: but if you augment the Fire a little towards the end, you will find in the Receiver a small quantity of *Quicksilver*, which will easily separate from the rest.

Butter of Antimony, together with its Cinnabar.

THE first of these Preparations is an *Antimony* opened, and rendred caustick, by the acids of *Sublimate Corrosive*; and the second is a mixture of the *Mercury* that was in the sublimate, and of the Sulphurs of *Antimony* sublimed together.

Fill a *Retort* half full with *Sublimate Corrosive*, and *Antimony* powder'd and mixed well together. Set your *Retort* in Sand in a small Furnace, and fitting a Receiver to it, and luting the junctures, proceed in the distillation the way I shewed in the preceding operation with *Regulus*, observing the same circumstances.

When the red vapours begin to appear, take away the Receiver, and put another in its place without luting the junctures; encrease the fire by little and little till you make the Retort red-hot: continue it so three or four hours, then let the Retort cool, and break it, you'll find a *Cinnabar* sublimed, and adhering to the neck, separate it and keep it: it is a good Remedy for the Pox, and the Epilepsie, it purges by Sweat; the dose is from six to sixteen Grains in Pills, or *Bolus*, with some proper Conserve.

Virtue.
Dose.

This *Butter of Antimony* is Caustick like the other I now spoke of. It may be rectified by distilling it anew in a glass Retort.

Remarks.

If the *Regule* be used for making the *Butter of Antimony*, there must be only six ounces of it to a pound of *Sublimate Corrosive*, as I have said above. But if crude *Antimony* be used, there must be equal proportions of both, because in a pound of *Antimony* there is only what is sufficient to receive and mix with the acids of a pound of the *Sublimate Corrosive*; for what remains is good for nothing.

How the
Butter of
Antimony
is congealed.

This *Butter of Antimony* is better congealed than the other: It also stops the neck of the Retort while it is distilled, whereas the other doth it not. This greater thickning is caused by its mixture with some small portion of the Sulphur of crude *Antimony*, together with the acids and *Regule*; for the ramous parts of the Sulphur are very proper to encrease the saline matters, and to fix them. The *Butter of Antimony* made with the

the *Regulus* is not free of Sulphur, but yet there is less in it, because the *Regulus* has been already purified from it: and that is the reason why this *Butter* is not so thick as the other.

There is more care required to whiten the *Butter* made of crude *Antimony*, than the other; for if either the fire be too great, during the distillation, or if the Receiver be kept too long joyned with the Retort, the red Sulphureous matters will mix with it, and make the *Butter* brown. When this happens, it must be put into a new Retort, and distilled over again, with a small fire of Sand to rectifie it. But if the directions I have given be carefully observed, there will be, upon the first distillation, a *Butter of Antimony*, as fine as the other.

Rectification of the
Butter of
Antimony.

There may be a difficulty started here, viz. Why the *Butter of Antimony* does come before the *Cinnabar*; for it would seem, That the *Regulus*, mixed with the acids, should be more weighty than the *Cinnabar*, which is compounded of two very volatile Ingredients. The Answer, which may be given to this, is, That the acids of the *Sublimate Corrosive*, being subtilized and exalted by the *Quicksilver*, are sufficiently volatile to raise the parts of the *Regule of Antimony* with which they are joyned, and to render them as light as the *Cinnabar*.

Difficulty.

In the Receiver are found little crystals sticking to its sides, which do curiously represent the branches of trees; these figures do proceed from the acid spirits of *Sublimate* mixed with *Antimony*.

If you have used five ounces of *Sublimate Corrosive*, and the same of *Antimony*, you'll draw two ounces and a half of very good *Butter of Antimony*, three

Quantity.

three ounces and six drachms of *Cinnabar* of *Antimony*, and half an ounce of Quick-silver.

The mass which remains in the Retort, does weigh two ounces and a half.

Thus the matter has lost six drachms, which loss happened whilst the *Cinnabar* was rising.

The Quick-silver is found in the neck of the retort with the *Cinnabar*, and in the last receiver.

Sometimes a kind of mossy substance is found at the end of the neck of the retort, which does represent many little figures; it is the more rarefied *Cinnabar*.

The mass which is found at bottom of the retort is the more terrestrious part of the *Antimony*, and is to be flung away.

In the preceding operation the *Mercury* did not find sulphurs enough to adhere to, whence it happened that it came forth flowing; but in this operation wherein crude *Antimony* is used, which hath all its sulphur, whilst the Corrosive spirits sticking to the *Antimony* come forth in Butter, the *Mercury* joyns with the sulphur, and by the action of fire sublimes afterwards into *Cinnabar* in the neck of the retort; for to make *Cinnabar*. Sulphur and *Mercury* must be sublimed together. Now if you have the curiosity to anatomise *Cinnabar*, you must powder it, and mix it with a double quantity of Salt of *Tartar*; then putting it into a Retort, distil with a great fire the *Mercury* into a Receiver filled with water, the Sulphur will remain in the Retort with the Salt of *Tartar*, but may be separated from it by boiling it in water. Filtrate the Decoction, and then pour upon it distilled Vinegar; a grey powder will precipitate, which may be washed with water and dried, thus you have

How *Cinnabar* is made.

have the Sulphur of *Antimony*, which is much esteemed for diseases of the Breast, fix or eight grains of it are given for a dose in some liquor appropriate to the disease.

Sulphur of Antimony.
Virtue.
Dose.

We do not always succeed in making *Cinnabar* of *Antimony*, whatever care be taken, and exactness observed in the operation: if it does not arise in the Retort two or three hours after a great fire has been set to it, it is in vain to look for it: This comes from the nature of the *Antimony* which is used.

Some give two or three Drops of the Butter of *Antimony*, in Broth, to cause a Vomiting, which produces the same effect as the powder of *Algarot*. But I do not approve this, because it is a strong Vomitive, and because one cannot be exact in the Dose while it is given in Drops.

An use of the Butter of Antimony disapproved.

If you mix Butter of *Antimony* with double its weight of oil or spirit of Sulphur prepared according to my description, you will have a liquor that is good for foul bones, and for venereal ulcers and Chancres; it is applied on pledgets, and works much like the oil or liquor of *Mercury* that I have described.

Liquor for foul bones.

If by way of Curiosity you distill a mixture, consisting of one part of *Tin*, and three parts of *Tinn*, or *Sublimate Corrosive*, both powdered after the same manner, as the Butter of *Antimony* is made, you shall have the Butter of *Tinn*, that is, a thick liquor, which is somewhat surprizing in that it always smoketh.

Butter of Tinn, or smoking liquor.

The

The Emetick powder of Algarot, or Mercurius vitæ.

IT is a Precipitate of *Antimony*, or Butter of *Antimony* washed.

Melt in hot sand the first butter of *Antimony* I described with *Regulus*, and pour it into an earthen pan wherein are two or three quarts of warm water, a white powder will precipitate, that must be sweetned with many lotions, and so kept; it is improperly called *Mercurius vitæ*. It purges upwards and downwards; it is given in Quartans and Intermitting feavers, and all the maladies wherein it is required to purge strongly; the dose is from two grains to eight in Broth, or some other convenient liquor.

Virtue.

Dose.

If you joyn all the lotions together, and evaporate about two thirds, or untill the liquor becomes very acid, you'll have a Philosophick spirit of *Vitriol*, that may be used like common spirit of *Vitriol*, in Juleps, to give them an agreeable acidity.

Remarks.

Philosophick spirit of Vitriol.

I have said before that the Butter or Icy Oil of *Antimony* was nothing but a mixture of the spirits of Salt and *Vitriol* with the *Regulus of Antimony*. This last operation confirms this opinion, because when this Butter is cast into warm water, these spirits render the liquor very acid, letting the *Regulus of Antimony* fall down to the bottom, so that the powder of *Algarot* is an *Antimony* transmuted much like the white flowers I spoke of before.

The

The water does separate or take off very well the acid spirits from the Butter of *Antimony*, because they cannot have a good hold in the pores of this softish and sulphureous mineral, but it was not able to separate those same acids from the Sublimate Corrosive, because the pores of *Mercury* being of a closer fabrick than those of *Antimony*, they do retain what they once receive into them, with greater strength.

The powder of *Algarot* may be made after the same manner as the Butter that may be drawn from crude *Antimony*, or else with the Liver, or Glass, but that which is made with crude *Antimony* is not so white as the rest.

If you do use four ounces of Butter of *Antimony*, you will draw an ounce and six drachms of *Mercurius vitæ*, after it is well washed and dried, insomuch that four ounces of this butter do contain two ounces and two drachms of acid spirit, *Quantity*, in which its corrosion does consist.

The acid liquor, called Philosophick spirit of *Vitriol*, does grow in a manner insipid in length of time, because its acidity has been volatilized by the *Mercury*, and afterwards by the *Antimony*.

The powder of *Algarotis* dissolved, neither by the spirit of *Nitre*, nor by the common *Aqua Regalis*, but by a mixture of the spirit of *Nitre*, *Salt*, and *Vitriol*, which is a kind of *Aqua Regalis*: If the dissolution be evaporated, and the spirit of *Nitre* twice cast in, and the humidity consumed every time, there will be a *Bezoar Mineral*, like to that which I am a going to describe.

Bezoar

Bezoar Mineral.

THIS Preparation is an *Antimony* fixed by Spirit of *Nitre*, and rendred sudorifick.

Melt in hot ashes two ounces of the a Butter of *Antimony*, and pour it into a Viol or Bolthead, drop into it good Spirit of *Nitre* until the matter is perfectly dissolved, commonly so much Spirit of *Nitre* is requisite as there is Butter of *Antimony*; during the dissolution there will rise up vapours that you must have a care of, and therefore you'll do well to place the vessel in the Chimney. Pour your solution into a glass body, or an earthen dish, and evaporate it in a gentle sand-fire until it is dry; there will remain a white mass, which you must let cool, and then pour upon it two ounces of Spirit of *Nitre*; set the vessel again in sand, and evaporate the liquor as before; once more pour two ounces of Spirit of *Nitre* on the white mass, and having evaporated the humidity, encrease the fire a little, and calcine the matter for half an hours time, then take it off the fire, and you have a white powder, which you must keep in a Viol well stopd. It is sudorifick, and serves for the same uses as *Antimonium Diaphoreticum*; the dose is from six to twenty grains in broth, or some appropriate liquor.

Virtue.

Dose.

Remarks.

A dissol-
vent for the The Spirit of *Nitre*, joyned to the acids of Salt and *Vitriol*, which are in the Butter of *Antimony* makes a kind of *Aqua Regalis*, which is a true

true dissolvent for the *Regule of Antimony*.

The Spirits of Vitriol and Salt were not strong enough, nor in quantity enough to make an entire dissolution of the *Antimony*, they only made a *Cause of light adhesion* to it: but when they are joyned ^{the Effervescency.} with Spirit of *Nitre*, they act with much more force; for they penetrate and divide every particle, and do render them imperceptible, and incapable of receiving a more exact dissolution. Now in this penetration, as in the solution of *Mercury*, there happens a great effervescency, for which reason I advise to pour the Spirit of *Nitre* by little and little, for fear the matter should rise above the vessel. This effervescency doth proceed from the resistance, that the edges of the Spirits do meet with, when they enter into the pores of the *Antimony*: for so soon as the dissolution is ended, there is no further Ebullition. Afterwards the humidity is evaporated, and new Spirit of *Nitre* poured twice more on the fixt mass, as I have said; after which the *Butter of Antimony* that was so great a Caustick, and Emetick, becomes one of the mildest medicins we have, and near approaching the preparation of *Antimony* that is called Diaphoretick.

This great change may well make us wonder at it, and it is hard to conceive how an acid Corrosive Spirit, such as Spirit of *Nitre*, should be able to sweeten a matter that became Caustick only for being impregnated with acid Spirits.

How the powder of Antimony becomes sudorifick by the Spirit of Nitre.

To give this difficulty some solution, it may be said, that the *Butter of Antimony* became Caustick, for that the acids which it contained did but superficially adhere, and were so adapted that the motion of the *Antimonial* parts did serve them

them for a vehicle to distribute their keennes as they did; but that after the solution, the acids being in great quantity, do fix the *Antimony*, and not only destroy its aptitude to motion, but do so theath or lock themselves in the pliant sulphureous parts of this mixt, that they lose thereby all their corrosion.

In the evaporation, abundance of the sulphurs, which were in the *Butter of Antimony*, are lost.

For the same reason, the *Butter of Antimony* loseth its *Emetick* quality in this Operation; for its saline Sulphur being partly evaporated, and partly fixed by the acids, there remains nothing capable to irritate the stomach. If there remain any volatile parts in the *Bezoar Mineral*, as doubtless there does, they are weak, and only capable to act by Transpiration.

This powder is called *Bezoar Mineral*, because it causes Sweat, like the *Bezoar* stone.

You must know that these preparations are nothing but so many transformations of the *Regulus of Antimony*, made by acid Spirits or by Fire; so that by Fusion, or by the means of some reductive salt, they may be recovered into *Regulus* again, by destroying those salts which kept them under this form.

Causlick Oil of Antimony.

THIS Preparation is a portion of *Antimony* dissolved in the acid Spirits of Salt of Vitriol.

Put into a glass retort six ounces of *Antimony* finely powdered, pour upon it four ounces of good Spirit of Salt, and the same quantity of the Causlick

stick Oil of *Vitriol*, shake and mingle them all together, and stopping the retort, set it in sand, with the nose upwards, give it a small digesting fire for four and twenty hours, then turn the nose downward, and when you have unstopt it, fit to it a glass receiver, lute the junctures with a wet bladder; make a little fire gradually to the second degree, and there will distil a whitish liquor; increase it a little at last, and continue it until nothing more comes forth into the receiver. Let the vessels cool, and unlute them, keep what you find in the receiver well stopt in a bottle.

It is an Escharotick liquor, and will serve to open Venereal Chaneres, to eat proud flesh, to cleanse old ulcers, to use in carious bones, and in the gangrene. They use it with pledgets.

Virtue.

Remarks.

The Retort must be big enough for at least half to remain empty, that the vapours may find room enough for their rarefaction.

I put the whole in digestion four and twenty hours, that the acids may have time to open the *Antimony*. If I should add unto this mixture eight or ten ounces of Spirit of *Nitre*, the *Antimony* would dissolve with a great ebullition, because those three sorts of acid Spirits would together make an *Aqua Regalis*, with which *Antimony* is easily dissolved, but there is no need of making so exact a dissolution for this Operation.

This liquor is improperly called Oil, for it is nothing but a solution of *Antimony* by acid Spirits. It differs from the Icy Oil of *Antimony* only in this, that it contains more phlegm, for the acids

*Improperly
called Oil.*

X

of

of *Sublimate Corrosive* have no aqueous moisture to dilute them, as there is in the acids we do here use.

With this Oil may be made the powder of *Algarot*, after the same manner as with the *Butter*, but only then it would not be so white. This liquor might be likewise used for the making *Bezoar Mineral*. Spirit of *Nitre* being poured upon it, there rises an ebullition, as when it is poured on *Butter of Antimony*.

This Oil of *Antimony* is not so Escharotick as the *Butter*, because it contains more phlegm. It is also more easie to use by reason of its liquidity.

Another Oil of Antimony.

THIS Preparation is a solution of some parts of *Antimony*, by the acid Spirit, and Oil of Sugar.

Take equal parts of *Antimony* and Sugar-Candy, powder them and mix them, put this mixture into a glass retort large enough for the matter to fill but a third part of it; set your retort in sand, and fit a receiver to it, give a gentle fire for the first hours to distil off a phlegmatick water; and when red drops begin to come forth, sing away that which is fall'n into the receiver; then resitting it, lute the conjunctions, and make the fire a little stronger, but manage it prudently; for otherwise the matter will rarifie and run into the receiver in substance, so that you'll be forced to begin the Operation anew; continue the fire until nothing more comes forth, and when the vessels are cold, take and keep what you find in the receiver.

This

This liquor is *Oil of Antimony*. It is proper to *Virtue*.
cleanse Ulcers with, and for Tettars and Itchings
which infect the skin. If it proves too sharp, you
may temper and qualifie it with the water of
honey.

Remarks.

The Sugar contains an essential acid Salt, and
an Oyl, which being mixed with a portion of the
Sulphurs of *Antimony*, do make an oily liquor.

The sweet taste of Sugar does proceed from
a natural mixture of this acid with the Oil, for if
you separate these two substances one from the
other, neither of the two will prove at all sweet.

The Oil all alone is insipid upon the tongue,
because it makes little or no impression on the
nerve that serves for tasting, but when the acid is
intirely mixed with it, the edges of this acid do
serve for a vehicle to the Oil to make it penetrate,
and tickle superficially the nerve, whereby the
sense of tasting is produced.

The acids therefore being alone, do become
incisive, and prick the tongue by their edges; but
when they are dulled and blunted by the ramous
parts of the Oil, then they have another sort of
determination, and can no longer pierce the
nerve of tasting but with a great deal of tender-
ness, and gentleness.

From a pound of Sugar-Candy and as much *Quantity*
Antimony, there may be drawn this way an ounce
and a half of phlegmatick Water, ten ounces of
Oil, and twenty ounces of a Terrestrial matter,
very much rarified, will remain in the Retort.

The Tincture of Antimony.

THIS Operation is a dissolution of the most rarified parts of the Sulphur of *Antimony* in the Spirit of Wine.

Dissolve upon a great fire in a *Crucible*, eight ounces of the Salt of *Tartar*; cast into it at several times, by spoonfuls, six ounces of powdered *Antimony*, which will melt and mix with the Salt of *Tartar*: cover the *Crucible*; and leave the mixture in fusion for half an hour, and pour it out into a Mortar, that it may cool: then beat the whole mass into powder, and put it into a *Matrass*: pour upon it the Spirit of Wine *alkalized*, to the height of four fingers, cover it with another *Matrass*, lute exactly the conjunctions, and set the matter a digesting, with a gentle heat, for two or three days, or until the Spirit of Wine become Red: separate then the *Matrasses*, and filtrate your *Tincture*, and keep it in a Bottle well stopd.

It is Sudorifick and Hysterick. It causes Vomiting, and it purges a little by Stool, when it is given in a great dose. It may be used to cause Women to have their due Terms, to take away Obstructions, for Hypochondriack Melancholy, the Itch, the small Pox, Malignant Fevers, and the Scurvy. The Dose is from four drops to twenty, in some proper liquor.

Remarks.

Remarks.

In this Operation, the Salt of *Tartar* rarefies the Sulphur of *Antimony*, and makes way for the Spirit of Wine to dissolve it. This dissolvent being sulphureous is proper for extracting of Sulphur, that is, The oily part of *Antimony*. This substance, before it was disengaged by the Salt of *Tartar*, was too closely shut up in the other parts of the Mineral to be separated by the Spirit of Wine alone. The Alkali Salt must first penetrate the *Antimony*, and divide the Sulphur, otherwise the Spirit of Wine, which consists of ramous and supple parts, could not be strong enough to dissolve it.

The Alkali Salt of *Tartar* doth dissolve a great part of the Sulphur of *Antimony* as it doth common Sulphur; for these Sulphurs are of the same nature. But the Spirit of Wine dissolveth only the fat and oily part of this Sulphur, and leaveth the saline part, with which it cannot unite, because its pores are disagreeable.

The vessel may be covered with horse-dung for making the digestion, this degree of heat being sufficient to draw the *Tincture of Antimony*. But if it be not done in three days, the vessel must be put into sand, the matter being first stirred about, and such a small degree of fire set under it as is sufficient to make it boil gently for some hours, which will turn it red.

This liquor has an agreeable scent, for probably there arises, with the *Tincture of Antimony*, something of the Salt of *Tartar* in the Spirit of Wine; and this also gives it a redness,

The Tincture loses its colour when kept.

as it happens in the *Tincture* of the *Salt of Tartar*: but this circumstance doth not make the Remedy better. When this *Tincture* is kept seven or eight months, it loseth much of its colour, because the more subtile parts of the Spirit of Wine evaporating, the sulphureous parts, which from the *Tincture*, by their division, close and precipitate, or rather they are suspended, in imperceptible heaps, in the Spirit of Wine.

The sudorifick vertue of this Remedy is chiefly from its having some small quantity of *Emetick* in it, which is not strong enough to cause a Vomiting, but dissipateth it self through the pores.

The *Tincture of Antimony* rarifies the blood, by the subtilty of its parts, therefore it is good for Hysterick Distempers; for it dissolveth and removeth Obstructions, which hinder necessary Evacuations, and are the cause of Vapours.

A great dose of this Remedy, raises a squeamishness in the Stomach, and inclinations to Vomiting, because of the Sulphur of *Antimony* which is a Vomitive: but then this is commonly followed with a Stool; for the *Emetick* being very weak, the provoked humors precipitate themselves downwards.

CHAP.

CHAP. X.

Of Arsenick.

Arsenick is a Mineral Body consisting of much Sulphur, and some Caustick salts. There are three sorts of it, the White that keeps the name of *Arsenick*, the Yellow called *Auripigmentum*, or *Yellow Orpin*, and the red called *Realgal*, or *Sandaracha*; the White is the strongest of all, and is sometimes transparent like crystal. Some do add to these for a fourth kind of *Arsenick*, a Yellow *Arsenick*, which is an *Orpin* differing from the other only in this, that it is not so transparent, nor of so high a colour.

None of these *Arsenicks* may be given inwardly, although several persons that have ventur'd to use the white, do pretend to have cured with it divers diseases, and among others the Quartan-Ague. They venture to give of it as far as four grains, in a great deal of water, and after that manner it will Vomit, like *Antimony*. But I can by no means allow of this *Febrifuge*, and would never advise any body to use so dangerous a Remedy. Nature doth furnish us with Medicines enough of Conscience to provoke Vomiting, without recourse to *Arsenick*. It is used outwardly with sufficient success, because it eats proud flesh.

People sometimes cover the Corns of their feet with *Arsenick* in powder, and it eats them to the root without any pain, but they must be sure to cover the adjacent flesh with a plaister of *Dia-*

X 4

palma,

*Auripigmentum,
Realgal,
or Sandaracha.*

*Arsenick
never to be
given in-
wardly.*

*Arsenick
eats away
Corns.*

palma, after the same manner as when Causticks are applied.

Remedy
against
the Poison
of Arsenick.

If by misfortune one has taken *Arsenick* inwardly, it may be remedied half an hour after, by drinking a great quantity of warm Oil or melted Grease or fat substance, to provoke a vomiting, or to purge. Afterwards the patient must only feed upon Milk for some days, and must be often purged with *Cassia* dissolv'd in *Whey*. *Orvietan*, *Treacle*, *Mithridate*, and other *Alexiteries* of this nature are rather prejudicial than useful on such occasions, because they are compounded of sharp and spiritous ingredients, which quicken rather than correct the vertue of *Arsenick*, as I have said, when I discoursed of *Sublimate Corrosive*. The only proper remedies are such as are Unctuous, and so can easily clog and blunt the Piquant salts of the Poison, and by this means hinder them from corroding the vessels they fall into, and which also are of that nature as to expell them either upwards or downwards.

Seeing the Caustick salt of *Arsenick* is enveloped with much Sulphur, therefore it is not so quick in its operation as the *Sublimate Corrosive*: But when this salt is once agitated, or disengaged from the Sulphur by fermentation, it acts as violently as the *Sublimate Corrosive*.

Regulus of Arsenick.

THIS preparation is the more fixt and compact part of *Arsenick*.

Powder and mix together a pound of *Arsenick* with six ounces of gravelled Ashes, incorporate this

this powder in a pound of soft soap, and make a paste of it, put it in a great Crucible, and cover it with an earthen cover, that hath a hole in the middle; set your Crucible in a wind-furnace, and give a little fire at first, then augment it gradually that the matter may be in a clear fusion: throw it into a mortar greas'd at the bottom, or into a *Cu- lot*, strike it round about a little with pincers, and let the matter cool, then knock it out, you'll find in the bottom of the mortar a *Regulus of Arsenick*, separate it from the dross. It is not so *Corrosive* as *Arsenick* it self, and its effect is milder.

Remarks.

The soap being full of an alkali salt, and the gravelled Ashes do correct or fix the great activity of the sulphurs of *Arsenick*.

A hole is made in the cover that the more volatile part may sublime with the Oil and humidity that are in the Soap, the alkali salts do remain in the dross with some part of the more gross Sulphurs of *Arsenick*.

If by way of Curiosity you should boil the *Sulphur of Arsenick* dross in water, Filtrate the decoction, and pour Vinegar upon it, or some other acid, to break the force of the alkali's, a *Sulphur of Arsenick* will precipitate, that is stronger than *Arsenick* it self.

Sublimate of Arsenick.

THIS operation is an *Arsenick* corrected from its more malignant sulphurs, and raised by the means of fire to the top of a matraass.

Put

Put what quantity you please of *Arsenick* grossly powdered into a Crucible, set it in a small fire under the Chimney to Calcine and evaporate about the third part of the matter. Avoid as much as may be this malignant vapour, pour into a mortar that which remains, and when you have powdered it, weigh it, and mix it with an equal quantity of *Salt Decrepitated*: put this mixture into a matrafs, whose two thirds remain empty; set your matrafs in sand in a small Furnace, and making a little fire at first, encrease it by little and little to the third degree, in order to Sublime the *Arsenick*: continue it in this condition until there rises no more, the operation is ended in five or six hours: let the vessel cool, and break it, gather that which sticks to the top of the matrafs, and keep it, fling away that which remains at bottom.

*Sweet
Arsenick.*

If you should repeat the Sublimation four or five times, adding salt each time, a sweet Sublimate of *Arsenick* would be made, that is to say, abundantly less corrosive than common *Arsenick*.

Some Authors tell us that this sweet *Arsenick* is a Counterpoison, but I shall never think it convenient to trust to such an Antidote, seeing we don't want those that are safer.

The Sublimate of *Arsenick* eats proud flesh, and cleanses old Ulcers, being mixed with the common *Suppurative*, and *Egyptiacum*.

The same Operation may be performed with *Orpin*.

Remarks.

Remarks.

The *Arsenick* is Calcined, to the end the more volatile part may fly away in fumes; if you should continue the fire, and encrease it toward the end, every jot of the *Arsenick* would fly away. Some do sublime it without addition of any thing else, after it is Calcined; but it is better to joyn some body that may fix it a little, such as Salt.

Seeing the sublimate of *Arsenick* doth resemble sublimate Corrosive in colour, some Cheats do falsifie Sublimate Corrosive by mixing with it that of *Arsenick*. I have shewn the way to discover this imposture in the Chapter of Sublimate Corrosive.

The Salt Decrepitated does fix the great volatility of *Arsenick*, and the fire carries off some of its more active sulphurs, insomuch that the oftner it is sublimed, the more it does dulcify, and becomes proper to apply to flesh, where we would gently corrode.

If you sublime *Arsenick* alone in a bolthead, with a great fire, without having Calcined it at all before, the sublimate will be converted into a glass, much resembling common glass both in colour and transparency.

Causlick *Arsenick*.

THIS operation is an *Arsenick* rendered more fixt, and more burning than it was before, and in form of a *Calx*, by the means of fixt salts.

Powder

Powder and mix together a pound of *Arsenick*, so much *Salt-peter*, and half a pound of *Sulphur*; put this mixture into an Iron mortar, cover it with a Cover that hath a hole in't; thrust a red-hot Iron, or lighted coal, through the hole, the powder will take fire with a great noise called detonation; this noise being over, and the matter cold, powder it grossly, and calcine it in a covered Crucible for two hours time over a great fire, then let it cool, and you'll have a Caustick matter that you must break into little pieces, and stop close in a Bottle to use as common Causticks.

Liquor of Arsenick.

If you set it in a Celler, or other moist place, it dissolves into a liquor, like the salt of *Tartar*.

Remarks.

Detonation whence.

This great detonation proceeds from the flagration of common Sulphur, and that of *Arsenick*, which being violently driven about by the volatile part of *Salt-peter* finds a little hole to fly out at. The more fixt part of *Arsenick* remains at bottom with the fixt *Salt-peter*. The matter is Calcined again, that being the more open, it may be the more Caustick; but this must be done in a covered Crucible; for otherwise the *Arsenick*, which is almost all of it Sulphur, would fly quite away by the great fire.

Corrosive Oil of Arsenick.

THIS liquor is an *Arsenick* opened, and become of the consistence of Butter, by the acids of sublimate Corrosive.

Take

The equal parts of *Arsenick*, and Sublimate Corrosive, powder and mix them, put this mixture into a glass-retort, and set it in sand; fit to it a receiver, and luting the junctures, distil with a gentle fire a butter-like liquor, resembling the butter of *Antimony*; and when no more will distill, take away the Receiver, and put another in its place filled with water. Encrease the fire, and you'll see the *Mercury* fall into the water drop by drop; continue the distillation till there comes no more.

You may use this *Mercury* on all occasions, like *Use* to another, after you have washed and dried it.

The Butter of *Arsenick* is a very strong Caustick, it makes an *Eschar* more quickly than that of *Antimony*.

Remarks.

The same thing happens in this operation, that I spoke of in the Butter of *Antimony*: that is, the Spirits of Sublimate Corrosive do leave the *Mercury* to joyn with the *Arsenick*, which they draw along with them in a gummous liquor: the *Mercury* being afterwards disengaged, and finding no Sulphurs to fix it, comes forth in a vapour, and condenses into water.

CHAP.

CHAP. XI.

Of Quick-lime.

*Why Lime
makes wa-
ter boil.*

Q Quick-lime is a Stone, whose moisture the Fire hath quite dried up, and brought into its place a great many igneous bodies. They are these little bodies that cause the Ebullition, when water hath opened the matter that kept them inclosed: and this Ebullition lasts until all the parts of the *Lime* are dilated, and the fiery particles set at liberty, so that there is no need of further trouble to get out. These little igneous bodies do likewise render the *Lime* Corrosive, for the stone is not at all so of it self.

*How it
comes to be
Corrosive.*

*Things ne-
cessary to be
observed in
making of
Lime.*

When the stone, that *Quick-lime* is made of, is grown red hot in the Furnaces, the Workmen have a special care to keep up the fire at an equal height, until the stone is quite Calcin'd; for if the flame which has begun to burn among the stones, should be suffered to lessen for a while, and so the heat be checkt before the end of the work, they would never afterwards be able to make *Quick-lime* with those stones any more, though they should be at the charge of burning fifty times as much wood as is commonly required; and this, because in that interval of heat, the pores of the stone, which were begun to be opened, do close and shut, and the matter sinks down in a lump to the destruction of the whole. And then again the flame can't rise in it any more, for it finds none of those *interstices*, or spaces between, which were frequent

quent before, for it to pass through. The matter therefore is rendred incapable of receiving the fire any more, because all the small cells that were useful for its reception, are shut up and destroyed in this confusion.

Paris-plaster bak'd is also a kind of *Calx* or *Quick-lime*: but seeing the pores of this stone are not disposed to retain so great a quantity of igneous particles as those of *Quick-lime*, therefore it is not so hot when water is thrown upon it.

It is objected, That if igneous bodies were they *Objection*, that caused the Corrosion of *Quick-lime*, *Tiles*, *Bricks*, and all stones that are not of the nature of *Lime-stone*, and *Iron*, *Copper*, *Silver*, *Gold*, and many other bodies should be as Cautick as *Quick-lime*, after having endured the fire as long, if not longer than it.

But this does not follow, For *Tiles*, and other *Answer*, Calcined stones have not the pores disposed like those of *Quick-lime*, to retain fiery particles; and if some metals are found impregnated with them during their Calcination, they are known to retain them so well by the solidity of their parts, *Why all* that neither the heat nor moisture of the flesh are *kinds of* able to draw them out of the places they are fixt *Calx are* in, to cause a Corrosion upon the part. It is easie *not Corro-* here to give you an example; for if you take the *five*, *Calx* of *Lead* that encreased its weight in the Calcination, as I have said before, and steep it in water, the water will not act at all upon it, and the *Calx* may be taken from the water in the same weight it was put in; you must melt it by fire, if you would separate the igneous bodies: but now as for common *Quick-lime*, a small matter of moisture is able to separate the tender parts of the

the stone, and drive out the fiery particles in abundance.

Objection. It is said likewise that the Ebullition of water which happens when flung upon *Quick-lime* must not be imputed to fiery bodies, seeing neither Spirit of Wine, nor Oil, when thrown upon it, do at all cause heat, although they are both of them inflammable bodies, nay, on the contrary they are observed to quench the heat that uses to happen to *Quick-lime* when water is joyned with it.

Answer. I Answer, That these effects do proceed from this, That Oil, Spirit of Wine, and other Sulphureous liquors of the same nature, instead of separating the parts of *Quick-lime*, as water does, do rather hinder any separation from being made by stopping up the pores, and by taking away all communication with the air, even as it happens when a Volatile Salt is covered with the Spirit of Wine well rectified, to hinder its dissolution or dissipation.

Moreover, I do not say, That these particles (which I call igneous) are always capable to excite a boiling and heat; perhaps some of them mix with the Spirit of Wine and Oil, without leaving the pores of the *Lime*, which is necessary to cause an Ebullition. I understand by the igneous particles, only that subtle matter which was much agitated in the Calcination, and which communicates its motion differently, according to the nature of the bodies it meets with: and if its motion be either abated or destroyed, it henceforth ceases to be of the nature of igneous particles.

That which withdrew me from the Sentiment of those who will have all the effects of *Quick-lime*

lime derived from its salt, was, that I could never find any in it, though I have sought after it with care enough: for some through mistake do take a certain Bituminous scum, which often swims upon the *Lime-water*, for a salt.

Some may perhaps say, That the igneous particles, which I give to *Quick-lime*, are not more demonstrative than the Salt: and if I will not admit a Salt to be in this Calcined stone, because I have not found it, neither ought I to pretend igneous particles until I can shew them.

But I Answer, That there is a great difference here; for Salt is a matter which may be condensed, and which doth easily discover it self to our senses: We may see it, feel it, and taste it: But igneous particles are of another nature; they are too subtile, too much rarefied, and too much in motion to be so sensibly discerned. We can only know them by their effects: and if by some means they may be condensed, they are no more igneous, because they have lost their motion, which is essential, and absolutely necessary to their nature.

Neither can I be of the opinion of those who will needs have an acid to be in *Quick-lime*, which being drawn out by the water, and meeting an Alkali, does cause the effervescency which is observed, when water is poured upon *Quick-lime*; for although according to appearance an acid may enter into the natural composition of the stone that *Quick-lime* is made of, this acid has lost its nature, not only by breaking its points in its strict union with earth at the Petrification, but also in the violent Calcination that is given to this stone to reduce it to a *Calx*. So that we

Y

may

may here say, the same thing happens to the acid which enters into the composition of the *stone*, as I have said did happen to the salt of Vegetables and other mixt bodies, which though naturally an acid salt, changes into an alkali by means of its union with earth, and the fiery particles in time of the Calcination; there is only this difference between them both, the acid of the *stone* is mixed with more earth than the salt of Vegetables.

Quick-lime mixed with acids, ferments sooner, and more strongly, than with common water, because being a substance very Alkaline, the acid points, which are very much agitated, enter into it with force, and divide its parts (at the very first) rudely; and by this means open a passage to the igneous particles which issue out violently.

When *Lime* is once slacked, it neither causes any more ebullition, nor heat, with water; but if you add to it an acid, it makes both a considerable ebullition, and heat, because the acid edges will penetrate into the particles of the *Lime*, where the water was not able to go.

There is not made any ebullition, or precipitation, by the mixing acids with *Lime-water*.

Phagedenick Water.

THIS Water is a mixture of Sublimate and *Lime-water*.

Lime-water.

Put a pound of *Quick-lime* into a large earthen pan, and quench it with seven or eight pints of hot water; after the *Lime* hath infused five or six hours, and is sunk to the bottom, pour off the water

water by Inclination, and filtrate it, this is called Lime-water.

To each pint of this water are added sixteen or twenty grains of *Sublimate Corrosive* in powder, and the water presently turns yellow; they are stirred together a good while in a glass or marble mortar, and this water is used for cleansing old Ulcers: it eats proud flesh, and is likewise used in the Gangreen, by adding Spirit of Wine to it, and sometimes Spirit of Vitriol.

Remarks.

Lime-water changes the colour of *Sublimate Corrosive*, because being an alkali, it destroys some part of the acids, which, according as they are diversly mixed with the *Mercury*, do give it different colours.

The precipitate of the *Phagedenick Water* being washed and dried, is esteemed by some to be a good Purgative in Venereal cases: It is given in Pills for fear of blacking the Teeth: the dose is from one grain to three; it purges upward and downward, and works much like *Turbith Mineral*.

Cautick Stones, or, Cauteries.

THIS Operation is the salt of *Gravelled ashes*, or the Lees of Wine Calcined, rendered more corrosive than it was before, by the igneous parts of *Quick-lime*.

Put into a great earthen pan, one part of *Quick-lime*, and two parts of *Gravelled ashes*, or Cal-

Y 2

cined

cined *Tartar*, powder and mix them; pour good flore of hot water upon your matter, and leaving it in infusion five or six hours, boil it a little; afterwards pass that which is clear, through brown Paper, and evaporate it in a Copper basin or earthen pan, there will remain at bottom a salt, which you must put over the fire in a Crucible, it will dissolve and boil until all the remaining humidity is evaporated. When you find it at the bottom like to an Oil, cast it into a basin, and cut it into pieces while it is warm; put these *Cauteries* quickly into a strong glass bottle, stop it with wax, and a bladder, for the air would easily dissolve it into a liquor: you must also take care to keep it in a dry place.

These *Cauteries* are the strongest of all that are made; and they are but half an hour in making.

Remarks.

Gravelled
Ashes
what.

Gravelled ashes are only a *Calcined Tartar*, for they are made by burning the Lees of Wine; but because these Lees, by reason of their liquidity have fermented more than common *Tartar*, the Salt which is drawn from them is of a more penetrating nature than other *Tartar*, and consequently is fitter to make *Cauticks* with. The *Quick-lime* does also help to make them much the stronger, for the igneous parts which it contains do mix with this Salt, and make it the more active, and corrosive.

You must not powder the *Quick-lime*, for the little fiery bodies would then fly away, before they could be received into the water.

When

When you filtrate the solution, you must put a cloth under the brown paper to support it, otherwise it would be presently corroded.

Ten or twelve ounces of Salt would be drawn from the *Gravelled Ashes* alone, but the slackt *Lime* retains a great deal of it.

If you have used in this Operation sixteen ounces of *Gravelled Ashes*, and eight ounces of *Quick-lime*, you'll have eight ounces of your Cauticks. *Quantity.*

If you would have the Cauticks in edges, you must put a hot Iron Spatule into the Crucible, whilst the matter is in Fusion, and form the edges in a flat bason. *Cauticks in edges.*

This Cautick Salt is very easily dissolved, and in the making of it you must not stay till it appears dry at the bottom of the vessel, as you do for other Salts; for it remains still fluid, though all the humidity of it be gone; therefore you must put a little of it to cool, that you may see whether it be in its due consistence.

The reason why it thus remains in Fusion is, because it is full of little fiery bodies which it has taken from the *Quick-lime*, and which have so disposed its parts to penetration; for all solid bodies which are put in Fusion by fire do receive this liquid form for no other reason, but because the little fiery bodies are become mixed with their parts, and have set them into a great agitation. *Why the Salt of Cauticks easily dissolves.*

If you should use *Lime* that is slackt, the Cauticks would not so easily melt; and if you draw the Salt from *Gravelled Ashes* alone, it will coagulate in drying, much as other Salts do; wherefore this Fusion of the Cauticks must needs proceed from the fiery bodies which were contained in the *Quick-lime*.

Cauticks may likewise be made divers other ways, but this description will deserve a preference before others, when you would have them be of a quick operation.

*Cautick
stone loses
its force if
long kept.*

If this Cautick stone be kept five or six months, its force is sensibly decayed, and it grows weaker as it is longer kept, because a part of the igneous particles, which are always in motion, do issue out of their little Cells where they are kept, and do dissipate themselves. However, the stone is still Cautick, but only it worketh more slowly, and therefore it is better to make them often, than to make many at a time.

Where *Soap* is made, Chirurgeons evaporate the water of *Soapweed*, and make use of the Salt, which is at the bottom, for their Cauticks; but ours are much stronger.

Inks called Sympathetical.

THESE Operations are liquors of a different nature, which do destroy one another; the first is an infusion of *Quick-lime* and *Orpin*; the second a Water turn'd black by means of burned Cork; and the third is a Vinegar impregnated with *Saturn*.

Take an ounce of *Quick-lime*, and half an ounce of *Orpin*, powder and mix them, put your mixture into a Matrafs, and pour upon it five or six ounces of water, that the water may be three fingers breadth above the powder, stop your Matrafs with Cork, Wax, and a Bladder; set it in digestion in a mild sand-heat ten or twelve hours, shaking the Matrafs from time to time, then

then let it settle, the liquor becomes clear like common water.

Burn Cork, and quench it in *Aqua vitæ*, then *Visible Ink*, dissolve it in a sufficient quantity of water, wherein you shall have melted a little *Gumm Arabick*, in order to make an Ink as black as common Ink. You must separate the Cork that can't dissolve, and if the Ink be not black enough, add more Cork as before.

Get the Impregnation of *Saturn* made with *Vi- Invisible Ink*, negar, distill'd as I have shewn before, or else dissolve so much salt of *Saturn* as a quantity of water is able to receive: write on Paper with a new Pen dipt in this liquor, take notice of the place where you writ, and let it dry, nothing at all will appear.

Write upon the invisible Writing with the Ink *Curiosly*, made of burnt Cork, and let it dry, that which you had writ will appear as if it had been done with common Ink.

Dip a little Cotton in the first liquor made of *Lime* and *Orpin*, but the liquor must be first settled and clear; rub the place you writ upon with this Cotton, and that which appeared will presently disappear, and that which was not seen will appear.

Another Experiment.

TAKE a Book four fingers breadth in bigness, or bigger if you will: write on the first leaf with your Impregnation of *Saturn*, or else put a paper that you have writ upon between the leaves; turn to t'other side of the Book, and having observed as near as may be the opposite

place to your writing, rub the last leaf of the Book with Cotton dipt in the liquor made of *Quick-lime* and *Orpin*, nay and leave the Cotton on the place, clap a folded paper presently upon it, and shutting the book quickly, strike upon it with your hand four or five good strokes; then turn the book, and clap it into a press for half a quarter of an hour; take it out and open it, you'll find the place appear black, where you had writ with the *Invisible Ink*. The same thing might be done through a wall, if you could provide something to lay on both sides, that might hinder the evaporation of the Spirits.

Remarks,

These Operations are indeed of no use, but because they are somewhat surprizing, I hope the curious will not take it ill, that I make this small digression.

It is a hard matter to explicate well the effects I have now related, nevertheless I shall endeavour to illustrate them a little, without having recourse to *Sympathy* and *Antipathy*, which are general terms, and do explicate nothing at all; but before I begin, we must remark several things.

The first is, That it is an essential point to quench the coal of Cork in *Aqua vitæ*, that the visible Ink may become black with it.

Secondly, That the blackness of this Ink does proceed from the fuliginosity or sooty part of the coal of the Cork, which is exceeding porous and light, and that this fuliginosity is nothing but an Oil very much rarefied.

Thirdly,

Thirdly, that the Impregnation of *Saturn*, which makes the invilible Ink, is only a *Lead* dissolved, and held up imperceptibly in an acid liquor, as I have said, when I spoke of this metal.

Fourthly that the first of these liquors is a mixture of the alkali and igneous parts of *Quick-lime* with the Sulphureous substance of *Arsenick*; for the *Orpin* is a sort of *Arsenick*, as I said before.

All this being granted, as no body can reasonably think otherwise, I now affirm, that the reason why the visible Ink does disappear, when the defacing liquor is rubbed upon it, is that this liquor consisting of an alkali salt, and parts that are oily and penetrating, this mixture does make a kind of soap, which is able to dissolve any fuliginous substance, such as burnt Cork, especially when it has been already rarefied and disposed for dissolution by *Aqua vitæ*, after the same manner as common soap, which is compounded of oil, and an alkali salt, is able to take away any spots made by grease.

But it may be demanded, why after the dissolution the blackness does disappear.

I answer, that the fuliginous parts have been so divided, and lockt up in the sulphureous alkali of the liquor, that they are become invilible, and we see every day that very exact solutions do render the thing dissolved imperceptible, and without colour.

The little alkali salt which is in the burnt Cork may also the better serve to joyn with the alkali of the *quick-lime*, and to help the dissolution.

As for the invilible Ink, it is easie to apprehend how that appears black, when the same liquor, which serves to deface the other, is used upon it.

For

For whereas the impregnation of *Saturn* is only a *Lead* suspended by the edges of the acid liquor, this *Lead* must needs revive, and resume its black colour, when that which held it rarefied is intirely destroyed; so the alkali of *Quick-lime* being filled with the sulphurs of *Arsenick* becomes very proper to break and destroy the acids, and to agglutinate together the particles of *Lead*.

It happens then that the visible Ink does disappear by reason that the parts which did render it black, have been dissolved; and the invisible Ink does also appear, because the dissolved parts have been revived.

Quick-lime and *Orpiment* being mixed and digested together in water, do yield a smell much like that which happens when common sulphur is boiled in a *Lixivium* of *Tartar*. This here is the stronger, because the sulphur of *Arsenick* is loaded with certain Salts that make a stronger impression on the smell. *Quick-lime* is an alkali that operates in this much like the Salt of *Tartar* in the other Operation; you must not leave the matras open, because the force of this water doth consist in a Volatile. The *Lime* retains the more fixe part of the *Arsenick*, and the *Sulphurs* that come forth are so much the more subtile, as they are separated from what did fix them before, and this appears to be so, because the Sulphurs must of necessity pass through all the book to make a writing of a clear and invisible liquor appear black and visible: and to facilitate this penetration the book is strook, and then turned about, because the Spirits or Volatile Sulphurs do always tend upwards; you must likewise clap it into a press, that these Sulphurs may not be dispersed in the air. I have found

found, that if these circumstances are not observed, the business fails. Furthermore that which persuades me that the Sulphurs do pass through the book, and not take a circuit to slip in by the sides, as many do imagine, is that after the book is taken out of the press, all the inside is found to be scented with the smell of this liquor.

There is one thing more to be observed, which is, that the infusion of *Quick-lime* and *Orpin* be newly made, because otherwise it will not have force enough to penetrate. The three liquors should be made in different places too; for if they should approach near one another, they would be spoiled.

This last effect does likewise proceed from the defacing liquor; for because upon the digestion of *Quick-lime* and *Orpin*, it is a thing impossible but some of the particles will exalt, stop the vessel as close as you will; the air impregnated with these little bodies does mix with, and alter the Inks, insomuch that the visible Ink does thereby become the less black, and the invisible Ink does also acquire a little blackness.

CHAP. XII.

Of Flints.

F*lints*, as all other stones, are made by different Salts, or by acid liquors, which do penetrate and incorporate with earth, which is an alkali, so that from their mixture there does result

*How Flints
are formed.*

result a *Coagulum*, which by little and little does harden by means of the subterranean heat, or else do petrify by the cold. Now you must observe, that according to the quantity of earth which incounters with this acid liquor, there are made such different sorts of stones. Thus precious stones and Crystals do obtain their hardness and transparency, from a just proportion, such as is needful to make an exact penetration, and a strict union of the acid with the earth.

It is very probable, that the different hardness of stones proceeds from the quantity of earth that enters into their composition, and that one is harder than another, according as it hath lesser earth in it: for then the acid water, acting equally upon all the parts of this earth, dissolves it exactly; and then also the Coagulation is longer a doing, and by this means the parts do unite and close together incomparably better than when there is much earth.

It is easie to conceive, that a hard body has been composed of very small particles; for otherwise there would have been empty spaces and great pores, which are contrary to the nature of hardness and compactness.

When the acid liquor meets with much earth, it only half dissolves it, and the Coagulation being quick, it forms an opaque and soft stone.

*Composition
of Flint.*

Flints have much acid or salt water in them, and but little earth: and as to their opacity, it is caused by the Sulphureous and sometimes Metallick earth wherewith they are compounded.

Crystals.

Crystals are formed by a perfect dissolution of earth or stone, in acid or salt waters; this dissolution must certainly be clear and limpid as water,

water, either because it is filtrated, passing through some earth, or because it falls into some clean place. When this dissolution settles, it fixeth together, as *Salt-peter* is *Crystallized* in water, and the *Crystals* retain the purity of the Dissolution, therefore it is that they are transparent.

Precious stones are compounded of a Dissoluti-
on at least as perfect and as clear as that of *Crystal*: *Precious stones.*
but some Metallick particles mix with their Dissolution, which is the cause of their different colours, and that they are much harder than *Crystal*.

Grains of sand are small *Crystals*, which appear *sand.*
to us only like the powder of *Crystal*, but by the help of a Microscope we discover their figure and texture.

There are found some waters in several places, *Petrifying waters.*
which falling upon stones do soon petrifie, as particularly in a Grot at *Arfi in Burgundy*. The reason that may be given of this petrification, is that these waters do contain an acid, which in passing through earths do dissolve some part of them, which is capable to make them petrifie, but the great agitation they are in whilst they run with rapidity down mountains, does hinder their coagulation; for that can never happen until these waters have fallen into some place fit for them to repose and lye still in.

There are in some places, waters which petrifie Wood, Plants, Fruit, and even the parts of Animals, when they are thrown into it. These waters are of the same nature with those I have mentioned, but they are not so Phlegmatick, and therefore they cannot Coagulate of themselves,
but

but meeting with some solid body, they penetrate it, and so shut up all its pores that they make as if it had changed its nature and become stone.

Calcination of Flints.

THIS Operation shews the way to open the bodies of *Flints* and *Cryſtal*, ſo that thereby they may be eaſily reduced into a powder.

Heat red-hot ſome *Flints* in the fire, and quench them in water; repeat heating and quenching them three or four times, or until they are friable, and can be finely powdered; you muſt chuſe *River-Flints*, that are full of veins of ſeveral colours.

Calcination of Cryſtal. *Cryſtal* is calcined after the ſame manner, but it is more eaſily made friable than *Flints*. A Li- quor and Tincture may be likewiſe drawn from it, the ſame way I am going to ſhew for *Flints*; their virtues likewiſe are both alike.

Remarks.

Choice of Flints.

Flints, which are found in Rivers or Waters, and which have veins of different colours, are eſteemed beſt, becauſe it is believed they yield moſt Tincture.

Flints and *Cryſtal* are too hard to be powdered the common way, and therefore means muſt be uſed to ſoften theſe ſtones for braying them more eaſily. Cold water makes them friable when they are thrown red-hot into it, for the Calci- nation having opened the pores, which the cold- neſs of the water ſhutting again ſuddenly, the ig- neous

neous particles within them endeavour to issue out impetuously, and to break their prisons, and so they rarifie the matter and render it brittle. The heating the *Crystals* or *Flints* red-hot, and quenching them in water, is repeated three or four times, that all their parts may be sufficiently penetrated and softened. Some use Vinegar instead of Water for quenching *Flints* and *Crystals*.

Tincture of Flints.

THIS Operation is an exaltation of some parts of *Flints*, and Salt of *Tartar* in Spirit of Wine.

Mix well four ounces of Calcined *Flints* finely powdered, with four and twenty ounces of Calcined *Tartar*: put this mixture into a large Crucible, cover it and place it in a wind-furnace, light a fire about it by little and little, to warm it gently, and then encrease it to the last degree. Continue it in this condition for five hours, that the matter may all the while remain in Fusion. Thrust a Spatule into it, and see if your matter begins to grow diaphanous like glass. If it doth so, pour it into a warm Iron mortar, and it will presently congeal into an hard mass, which you must powder while it is hot, and put into a matrafs very dry and hot: pour upon it Spirit of Wine Alcoholized, four fingers above the matter; stop your matrafs close with another, whose neck may be received into that which contains the matter. Lute the conjunctions well with a wet bladder, and set it in sand, give a fire under it that is strong enough to make the Spirit of Wine simmer
for

for two days together, it will turn of a red colour; unlute your matrasles, and separating them a-sunder, decant the *Tincture* into a bottle: put new Spirit of Wine to that which remains, and digest it as before, separate the liquor that is turned red, and mingling it with the former, pour it all together in a glass body, and cover it with a head, fit to it a Receiver, and lute the junctures, distil in a vaporous bath two thirds of the Spirit of Wine, that may serve for use as before, then take your vessel off the fire, and keep that which remains in the bottom of the body, in a Viol well stopd.

Virtue.

This *Tincture* is said to be a good remedy to open Obstructions; they use it for the *Scurvy*, and in Hypochondriacal cases: the dose is from ten to thirty drops in some proper liquor.

Dose.

Remarks.

The *Calx of Flints* doth so strictly incorporate with the *Salt of Tartar* by the Calcination, that they may be said to be converted into a Salt; and this I shall shew in the following Operation.

You must use the Spirit of Wine highly Alcoholized, otherwise you will not gain the *Tincture*; you must likewise observe to infuse the powdered matter while it is as hot as may be; two thirds of the Spirit of Wine are distilled off, that what remains may be the redder and stronger.

Almost all Chymists will needs make this red colour to proceed from the *Sulphur of Flints* extracted by the Spirit of Wine, but it is more probable that this colour proceeds from an exaltation of the Alkali Salt in Spirit of Wine, because a like *Tincture* is made on *Salt of Tartar*.

Liquor

Liquor of Flints.

THIS Operation is a solution of *Flints* into a liquor, by the means of *Salt of Tartar*.

Take the other part of your *Flints* Calcined with *Tartar*, and set it in a Cellar in a glass pan, it will dissolve into as clear a liquor as water. Filterate and so keep it.

This liquor is said to be Diuretick, it is given *Virtue* from six to five and twenty drops in some convenient liquor. *Dose*.

If you mix an equal part of this liquor with *A Stone*, some acid Corrosive Spirit, you'll presently turn it into a stone.

Remarks.

This *Salt of Tartar*, or the *gravell'd Ashes*, have so attenuated the *Flint* that it becomes as soluble as they; and we see the truth of this in the operation, for the moisture of the Cellar entring into the pores of our calcined matter dissolves it imperceptibly, and if this dissolution should be evaporated, an Alkali Salt is found at bottom.

When this liquor is mixed with an acid Spirit, *Ebullition* an Ebullition presently happens, from the acid Spirits piercing the alkali, and afterwards a stronger Coagulation is made, then when an acid Spirit is poured on the Oil of *Tartar*, because this same alkali contains more earth than does the *Salt of Tartar*.

This liquor may dissolve some Sulphureous obstructions that now and then happen, and then it *This Liquor may be turned into a Stone in the body* provokes

Z

provokes Urine; but if it meets with an acid humour, it causes a Coagulation, that may turn into a stone: wherefore I would not advise any body to use this Remedy, no more than the former *Tincture*, which works only by its Salt that is mixed with the Spirit of Wine.

From the Coagulation of these liquors may be sensibly explicated, how stones come to be formed in several parts of our bodies, seeing acid liquors and alkalies do so often meet within us.

The *Tincture of Flint* is used to extract the Sulphur of many Minerals; *Alchymists* have given it no less than the name of *Alkabeft*.

CHAP. XIII.

Oil of Bricks.

THIS Preparation is *Bricks* impregnated with *Oil of Olives*, and afterwards distilled.

Heat red-hot among burning Coals pieces of *Brick*, and quench them in a pan filled half full with *Oil of Olives*, but take care to cover it immediately, for the *Oil* will else take fire. Leave them in Infusion ten or twelve hours, or until the *Oil* hath sufficiently penetrated the *Bricks*, after that separate them, and when you have grossly powdered the *Bricks* imbibed with the *Oil*, put it into an earthen Retort, or glass one luted, large enough for a third part to remain empty; place it in a Reverberatory Furnace, and fit it to a large capacious

capacious Receiver, lute well the conjunctions, and give a little fire at first to warm the Retort, then encrease it by degrees, until you see vapours come forth; then continue it in this condition till there comes no more: unlute the conjunctions, and take away the Receiver, there remains in the Retort all the *Brick*, which you must fling away as useless.

Mix the *Oil* that remains in the Receiver with a sufficient quantity of other *Brick* dried and powdered, and make a paste of it, form several little pellets, and put them into a glass Retort; set the Retort in Sand, and fitting to it a large Receiver, and luting them together, give a fire by degrees to rectifie all the *Oil*, pour it into a Viol, and keep it for use; it is called the *Oil of Philosophers*.

It is a good Remedy applyed outwardly to discuss the Tumors of the Spleen, for the Palsie, Phthilick, and suffocations of the mother. It may be given inwardly from two to four drops, in Wine, or some appropriate liquor. Some drops of it are insilled into the Ear to dissipate the flatulent humours that are there inclosed.

Remarks.

This Operation serves only to exalt the *Oil of Olives*, that being more opened by the fire, it may rarifie and dissolve humours more easily; for you must not imagine that the *Brick* doth communicate any great vertue, it is a dry body, and wants all active principles.

You must make a very moderate fire in this distillation, that the *Oil* may come forth in vapours;

pours; for if it should come out drop by drop, it would not be so open, nor would it produce so good effects.

Rectification.

Some do rectifie the *Oil of Bricks* with Colcothar instead of *Bricks*, or else with the mass that remains after the distillation of *Aqua fortis*.

*Why called
The Oil of
Philosophers.*

Antient Chymists have given the Epithete *Philosophick* to all preparations wherein they have used *Brick*. The reason that can be given for it is, That because they call themselves the only True Philosophers, or Philosophers by way of excellence, they thought they were obliged to confer some influences of this mighty name upon *Bricks*, because they are the materials wherewith they build their Furnaces, to work at the high and mighty Operation, or the *Philosophers stone*; for they pretend it is by this Operation alone that True Philosophy can be obtained.

CHAP. XIV.

Of Coral.

*Coral
what, and
where
found.*

CORAL is called *Lithodendron*, that is, a petrified plant, because it grows under deep hollow Rocks, in many places of the Mediterranean Sea, where the Sea is deep; or rather it is a certain shoot from a Rock, that hath received the form of a Plant. It is not true, that it is taken out of the Sea soft, as some have said. There are of them of several colours, as the

the *White*, the *Red*, and the *Black*; now and then there are found some of two colours, as *Red*, and *Black*. *Different kinds.*

The *Red* is the most common, and most in use; it is chosen of a deep colour; the *White* is more rare than the *Red*. A certain white stone very spongy, that is like unto *Coral*, is brought among us, which is mistaken for true *white Coral* by those that don't know it, but the true is not at all spongy; it is rather very compact, and as white as Ivory; *Black Coral* is the greatest rarity of them all. *False Coral.*

If you put the branches of *Red Coral* to infuse a day or two in melted white Wax, upon hot embers, the *Coral* will lose its former colour, and become white, and the Wax will assume a yellow colour. The Wax must be a fingers breadth above the *Coral*. *White Wax taketh the Tincture of Coral.*

If you should put other *red Coral* to steep in the same Wax, it would turn brown.

If again the third time you should put *red Coral* to steep in the same Wax, the Wax would then become red.

The Wax dissolves a little of the bituminous matter that is upon the *Coral*, and which did render it red: this Operation is done only for curiosity.

Many persons do hang *red Coral* about the neck, in order to stop Hemorrhages, to purifie the blood, and to fortifie the heart. I believe that which gave occasion to think it has such excellent vertues, was its Red colour, which is like to that of the blood, and the heart; but experience does no way confirm, that outwardly applied, it has any such effects.

*Preparation
of Coral.*

Coral is prepared by beating it on a Marble into a most fine powder, that it may the more easily be dissolved; and this prepared *Coral* is given to stop *Dysenteries*, *Diarrheas*, *Flux* of the *Hæmorrhoids*, and *Terms*, *Hæmorrhagies*, and all other distempers that are caused by an acrimony of humours, this being an alkali that destroys them; the dose is from ten grains to a drachm in Knot-grass-water, or some other appropriate liquor. The more Red *Coral* is beaten, the more it loses its colour.

Venus.

Dose.

Dissolution of Coral.

TAKE what quantity you please of *Coral* finely powdered on a Marble; put it into a large matrafs, and pour upon it distilled *Vinegar* enough to cover the matter four fingers high, there will happen a great effervescency, which being over, set your matter in digestion in warm sand for two days, stirring the matrafs from time to time. Leave the *Coral* to settle at bottom, and decant the clear liquor into a bottle. Pour again so much distilled *Vinegar* on the remainder, as before, and leave it two days in digestion; separate the clear liquor, and continue to add more distilled *Vinegar*, and to draw off the impregnation, until all the *Coral* is in a manner dissolved. Then mix your dissolutions, and pour them into a glass Cucurbite, or else into an earthen one, evaporate in sand two thirds of the liquor, or until there appears upon it a very fine skin: Filtrate this Impregnation, and keep it in order to make the *Salt*, and *Magistery*, as I shall shew hereafter.

It may be given for the same purposes as the *Vertue.*
Salt, the dose is from ten to twenty drops in some *Dose.*
 appropriate liquor.

Remarks.

Red Coral is generally used, because it is thought to have more *vertue* than the rest, by reason of its Tincture.

The Effervescency which happens, when *Vine- Cold Effervescency.*
gar doth penetrate *Coral*, is reckoned among cold Effervescencies, if there be any such; for my part, I cannot say that I ever perceived any coldness in it. In truth it is very strange, that so great an Ebullition, or motion of the parts, should not produce any sensible heat; but you must consider, that *Coral*, having large pores, may be easily dissolved, and so the acids need not jostle it very much, which would be requisite to produce any considerable heat.

Some do use in this Operation the acid Lotion of *Butter of Antimony*, or pure *Spirit of Vitriol*, instead of *Vinegar*; but because these spirits do leave too great an acidity in the Preparations of *Coral*, I conceive it better to use distilled *Vinegar*.

Coral being an alkali, the acid points do stick in it, and suspending its parts, do render them imperceptible; and this is the reason that the *Vinegar* doth lose all its acidity, because the acidity did only consist in the activity of its points, which do now sheath themselves in the alkali.

If you would, by way of curiosity, distil this dissolution, instead of Evaporating it, as I have said, you'd gain nothing but an insipid water, because the acid is fixt with the *Coral*. This water

*Dissolution
of Pearl
and other
alkalin
matters.*

is evaporated away, because it would serve for nothing, and would only weaken the impregnation.

The dissolution of *Perle*, *Crabs-eyes*, burnt *Harts-horn*, and all other alkali matters, is performed after the same manner; their *Salts* and *Magisteries* may be likewise made as those of *Coral*, which I am going to describe.

It is here remarkable, that the solution of this sort of alkalies in distilled *Vinegar*, smells much like Spirit of Wine, and that some quantity of it may be drawn, with a very gentle fire; the reason of it is, that in the making of *Vinegar*, the acids had in a manner fixed the sulphureous Spirit, but when they do enter into the pores of *Coral*, they are forced to quit it, and so let it recover its volatility.

Magistery of Coral.

TAKE what quantity you please of the impregnation of *Coral*, either red, or white, made with distilled *Vinegar*, as I have said before; pour it into a *Viol* or *matrass*, and drop into it the liquor of the *Salt of Tartar*, made *per deliquium*, a Curd will appear which will precipitate to the bottom in a very white powder; decant the clear liquor, and washing your powder five or six times with water, dry it, it is that which is called the *Magistery of Coral*. Great virtues are attributed to it, such as, to revive and fortify the heart, resist poison, stop the bloody Flux, and all other *Hæmorrhagies*. The dose is from ten to thirty grains in some liquor appropriate to the disease.

virtue.
Dose.

Remarks.

Remarks.

The name of *Magistery* is given only to *Precipitates*; and they are so called, to express something more exquisite than ordinary.

The liquor of *Tartar*, which is an alkali Salt dissolved, encountering the acid, makes it let go the particles of *Coral* that it held suspended, and so they precipitate by their own weight; this precipitate is nothing else but a *Coral* finely powdered by means of acids, which do easily divide into abundance of parts things that otherwise would seem indivisible. But you must observe here, that these preparations, instead of rendring *Coral* more effectual, as is pretended, do indeed render it almost good for nothing; which is a thing easie enough to prove, if we consider that *Coral* works in our bodies by nothing else but by absorbing acids, or sharp and salt humours which do continually occasion divers diseases; for example, it stops *Hæmorrhagies* only by sweetning the keen Salts which corroded the membranes of the veins, or else raised great effervescencies in the blood, so as to make it extravasate; it stops *Diarrheas*, by destroying the acrimony of the Cholera, or other humours; lastly, if it cures the falling down of the *Uvula*, and does remedy many other accidents, it is done by nothing else, but by breaking the force of the ferments which do cause them, after the same manner as it destroys the acidity of Vinegar, or some other liquor; this being so, as there is great reason to believe it, it were far better to take *Coral* without any other preparation than that which is made on the marble, then to dissolve

*Prepared
Coral hath
more vertue
than the
Magistery.*

*The reason
of its effects.*

dissolve it by an acid, and precipitate it into a *Magistery*; for the acid or sharp humors that this *Magistery* is to encounter in our bodies, finding nothing in the medicine that is able to blunt their edges, will continue their former activity, and so no effect at all will follow.

Why no effervescency in the precipitation.

In this precipitation there does not appear any effervescency, because the edges of the Vinegar being broken, it has neither strength nor motion enough left to penetrate and to separate the parts of Salt of *Tartar*; but if the dissolution of *Coral* had been made with some stronger dissolvent than Vinegar, such as Spirit of *Vitriol*, there would be an ebullition in the time of the precipitation, because there would remain still action enough to the broken edges of that Spirit, for to enter into the pores of the alkali Salt, and to rarify it.

When *Red Coral* is beat into powder it becometh white, and when ground, it turns pale; but the acids again give it a whiteness, by dividing it more; the cause of which can only be the different disposition of its Parts, which occasions different reflections of the light to our Eyes.

Some, desiring to give a Red Colour to their *Magistery*, do tincture the distilled Vinegar, used for the dissolution of *Coral*, with red *Roses* dried.

Salt of Coral.

THIS Operation is a *Coral* rarefied, and opened by the Spirit of Vinegar.

Take what quantity you please of the dissolution of *Coral* made by distilled Vinegar, as I said before,

before, pour it into a glass Cucurbite, or earthen pan, and evaporate in sand all the moisture, there will remain at bottom a *Salt of Coral*; keep it in a Viol well stoppt; it is given for the same reasons as *Vertue*, the *Magistery*, the dose of it is less, being from *Dose*, five to fifteen grains.

Remarks.

In this Evaporation there come forth only the watry parts, and the acids adhering to the *Coral* do form a kind of *Salt*, which has figures of branches like to those of *Coral*.

No true Salt can be drawn out of *Coral*, tho' *Salt of Coral* probably there was much entered into its composition, seeing it has its Origin and growth in the Sea. If there were any Salt in this petrified Plant it would dissolve in hot water like other Salts, for it is an essential property of Salt to dissolve in water: but prepare *Coral* never so well, calcine it, steep it, and boil it in water, never any Salt can be taken out of it. The reason hereof may be, That the principles of this mixt were so well united in the composition, that they have bruised the particles of Salt, and absorbed them by the fermentation, so that they have changed both their Figure and Nature, and consequently are no more Salt.

Tho' the preparation I have given be called *What that* the Salt of *Coral*, yet it is not, it is rather the *which is* Salt of Vinegar, seeing it is only compounded of *called Salt* the acids of Vinegar, fixed into the pores of *of Coral is* the *Coral*, as in an earthy substance, proper to corporifie them.

For

For a proof of what I say : If this Salt of *Coral* be dissolved in water, and the Oil of *Tartar per deliquium* be poured upon it, it will become a *Magistery*, that is, a powder of *Coral*, because the acids of the Vinegar, which were formed into Salt, are broken by the liquor of the Salt of *Tartar*.

If you should put this Salt of *Coral* into a Retort, and distil it in sand, you would obtain a liquor that is only styptick, without any considerable acidity, which shews that the acids are destroyed, and do not come forth of the alkali, as they entered in. There will also remain in the Retort a gray powder of *Coral* which is of no use.

CHAP. XV.

Of Common Salt.

Common Salt, Sal Gemme, Fountain Salt, and Sea Salt.

THERE are three sorts of *Common Salt*, the *Fossile Salt*, the *Fountain Salt*, and the *Sea Salt*; the first is called *Sal Gemme*, by reason of its transparency and smoothness, like to a precious stone; it is that of which whole Mountains are found full in *Poland*, and other places; the second is drawn by evaporation of the waters of some Fountains, and the last from Sea-water by Crystallization or Evaporation: these three Salts are of the same nature, and have almost the same effect; they are used, not only in Aliments, but sometimes in Remedies too, such as Clysters, when they should be made very Carminative.

It is here observable, that *Sal Gemme* is a little more penetrating than *Sea salt*, that is drawn by Crystallization, and that the *Sea salt* which is drawn by Crystallization is more penetrating than that which is made by Evaporation of the waters.

The reason that may be given for the piercing quality of *Sal Gemme* is this, that having never been dissolved in water, it never lost any of its keenness, whereas the others do lose their more subtle edges in the waters, and this chiefly when those waters are in strong agitation, as are those of the Sea.

It is very probable that the violent Vomiting which does so much annoy those who take a voyage to Sea, does proceed from these same subtle parts of salt, which being volatilized do fill the sea-air; for this vomiting does happen only to such who have not been used to breath a salt air, and who besides are sufficiently shook by the motion of the Sea.

A probable Cause of Sea-sickness.

The *Sea Salt* which is made in *Normandy* by evaporation of *Sea-water* over the fire, is not so strong as that which is made at *Rochebelle* by Crystallization, because in the evaporation many of the subtler parts of the Salt are lost, and a mark of that is, that if *Sea-water* is distilled over a fire never so small, it will not fail to carry with it some volatilized salt, which will alter its virtue, as experience hath testified several times.

Salt made by Crystallization is strongest.

But it doth not happen thus to *Sea-salt* Crystallized, for it fixes of it self, when the Salt-waters have settled for some time in places fit for their reception.

I have delivered my thoughts sufficiently touching the Origine of these three sorts of Salt, in the
Remarks

Remarks I made on the principles: wherefore there's no need of repeating what I then said.

How Ro-
chel-Salt is
made.

Sea-salt is made at *Roche* in salt marshes, which are places that must be of a lower situation than the sea, and the ground must be Clayie, for otherwise they would not be able to retain the salt-water that has been let into them. Thus all places near the sea are not alike proper to make salt marshes.

When the Season of the year begins to grow hot, which commonly happens in *May*, all the water is emptied that was let into the marshes for the better preserving them during the winter, then the sluices are opened to let in as much salt-water as they think fit; it is made to pass through a great many different Channels, wherein it purifies and heats, and then is let into places that are made flat, smooth and fit to Crystallize the salt.

The salt is made only during the great heats of Summer, the Sun does first evaporate some part of the water, and because after the great heat, a small wind does use to blow (as is usual near the sea) the coolness of this wind does condense and Crystallize the salt.

But if it happens to rain but two hours during the hot weather, there can no salt be made for a fortnight afterwards, because the marshes must be again emptied of all the water, to let in more in its place, so that if it chances to rain but once again in the next fortnight, they can make no salt.

Purificati-
on of Salt.

Salt is purified, by dissolving it in water, then filtrating the solution through brown paper, and afterwards evaporating the water in an earthen pan, until a very white salt does remain.

But

But besides the purification of Salt by evaporation, it may be further purified, if instead of evaporation of the humidity, you set some of it a Crystallizing in a cool place, for very pure salt is found at bottom of the vessel, which salt may be separated from the water, and dried, and you may then evaporate again some part of the salt liquor, and set it in a Celler a Crystallizing, and so continue your evaporations and Crystallizations; but at last you must be fain to evaporate all the liquor, because at last it will Crystallize no longer, the reason whereof is, that the remaining salt is full of a fat bituminous matter, which is in a manner inseparable from it, and this it is that hinders the Crystallizing at last.

It is probable that this fat matter may come from the earth of those marshes that were spoken of.

The first Crystallized salt being put into *Oil of Tartar*, or some other alkali salt dissolved, does mix with it without making any Ebullition, because although sea salt is acid, yet its points are too gross, and have too little motion, to separate the parts of the alkali.

The last salt being dried over the fire, and mixed with some alkali salt rendered liquid, such as *Oil of Tartar*, makes a Coagulation and precipitation of a substance that appears saline and oily; this Coagulation does proceed from the mixture and adhesion of some Bituminous earth with the sea-salt and the Tartar; for the salts do easily unite with oily substances, and in them lose their activity.

Many acid Bituminous salts which are drawn by the Evaporation of certain Mineral waters, such

such as those of *Baleruc* in *Languedoc*, and *Digne* in *Provence*, do perform the same effects, when they are mixed with *Oil of Tartar*.

This *Coagulum* does not dissolve in water, as well by reason of the different nature of the salts it is compounded of, as the oily earth that holds them together; but it will dissolve in distilled *Vinegar*, and several other acid liquors, and then happens an effervescency, because the acid does penetrate the salt of *Tartar*, whose parts the sea-salt had no power to separate.

Calcination of Common Salt.

H Eat a pot, that's unglazed, red-hot; throw in to it about an ounce of sea-salt, then cover it, and it will crackle, and so fall into powder: this noise is called *Decrepitation*: when it is over, put so much more salt into the pot, and continue to do so, till you have enough. The pot must be sure to be red-hot all the while: when the crackling is over, take the pot out of the fire, and when it is cold, put the salt into a bottle, and stop it well, to hinder the air from entering in to moisten it anew. Bags full of it are applied behind the neck warm, (to consume too great a moisture of the Brain) by opening of the pores. It is used likewise in several Chymical operations.

Remarks.

That which makes the Salt crackle, when it is in the fire, is an inwardly contained moisture, which upon its being rarified doth force its way out

out with impetuosity, and finding the pores too closely shut to suffer an easie escape, doth break through the parts and open a passage. Now every thing else that hath close compact pores, will make such a noise too in the Calcination, as do glass and shells.

If you have occasion to use Salt decrepitated, it *salt newly decrepitated best.* is convenient to have it newly calcined, because the moisture of the Air does return again what the Fire had driven away. But if you would keep it any time, let it be in a glass bottle well stopd.

For as much as this Salt is deprived of all humidity by its Calcination, it will absorb ferocities much better than common Salt. It is laid hot behind the neck, to the end that opening the pores it may facilitate transpiration. A little Salt of *Tartar* may be mixed with it, to render it the more active.

If you have calcined twelve ounces of Salt, there *Quantity.* will be ten ounces and a half after the Operation.

Spirit of Salt.

THIS Spirit is a very acid liquor, drawn from Salt by distillation.

Dry *Salt* over a little fire, or else in the Sun, then powder finely two pounds of it, mix it well with six pound of Potters earth powdered, make up a hard paste of this mixture with as much rain-water as is needful, form out of it little pellets of the bigness of a Nut, and set them in the Sun a good while a drying; when they are perfectly dry, put them into a large earthen Retort, or glass one luted, whereof a third part remains empty;

A a

place

place this Retort in a Reverberatory Furnace, and fit to it a large capacious Receiver, without luting the junctures, give a very moderate heat at first to warm the Retort, and make an insipid water come forth drop by drop; when you perceive some white clouds succeed these drops, pour out that which is in the Receiver, and having refitted it, lute the junctures close; encrease the fire by degrees to the last degree of all, and continue it in this condition twelve or fifteen hours; all this while the Receiver will be hot, and full of white clouds, but when it grows cold, and the clouds do disappear, the Operation is at an end; unlute the junctures, and you'll find the *Spirit of Salt* in the Receiver, pour it into an earthen, or glass bottle, and stop it well with wax: it is an Aperitive, and is used in Juleps to an agreeable acidity for such as are subject to the Gravel. It is likewise used for cleansing the Teeth, being temper'd with a little water, and to consume the rottenness of bones.

Vertue.

Spirit of Salt dulcified.

To make the dulcified *Spirit of Salt* of *Basilius Valentinus*, you must mix equal parts of *Spirit of Salt* and Wine, and set them in digestion two or three days in a double Vessel, in a gentle sand-heat. It is esteemed better than t'other to be taken inwardly, because it is less Corrosive, being corrected by the *Spirit of Wine*; the dose is from four to twelve drops in some liquor appropriate to the disease.

Dose.

Remarks.

Why Potters earth added.

The Potters earth is mixed with the Salt, to divide it into particles, that the fire may the

the more easily be able to rarify it; for the parts which Salt consists of are so strictly united, that the utmost force of fire is not able to disengage them, until they are separated by some *Intermedium*.

The preparation that I give unto Salt, before it is put into the Retort, is longer than the common sort; but I have observed, that the Spirit comes forth with less difficulty, when the matter is prepared according to this form.

You must leave a vacancy in the Retort, and fit to it a large Receiver, for giving liberty to the Spirit to circulate before it dissolves, otherwise it would break them both. Likewise the fire must be encreased by little and little, because the first Spirits do break out with a mighty violence, when they are driven too hard.

If after the distillation you pour the Spirit of Salt from the receiver into a glass Cucurbit, and fit to it a head and receiver, luting exactly the conjunctions, and distil about the third of the liquor upon a gentle fire of Sand, you shall have a Spirit of Salt weak indeed, but very agreeable to the Taste; and what remains in the Cucurbit will be stronger than before, because it is deprived of its more phlegmatick part, and that there remains only the strongest and most fixed acids. It is now of a Yellow colour and very weighty. These two Spirits of Salt have the same virtue; only the Dose of the first must be greater than that of the last.

If you will be at the pains to draw out the Salt, which remains in the Retort with the Earth, after the distillation of the Spirit, it must be done thus. Wash the matter in a great quantity of
A a 2 hot

*Refinement
of the
Spirit of
Salt.*

*Weak Spi-
rit of Salt.*

*Strong Spi-
rit of Salt.*

*Salt in the
Retort after
distillation.*

hot water, until the Earth be altogether insipid, then filtrate the liquor, and evaporate the humidity, and there will remain a white Salt, which may be used as common Sea-Salt: It is a little sharper, because the Fire has given it some impression, and therefore less of it will serve, but it has no pernicious quality.

The acids of Sea-salt are not separated as those of *Salt-peter*, tho' the same means be used, because the natural elaboration of Sea-salt is much more perfect, that is, the acids of it are more strictly united with their Earth which makes Sea-salt fixed, whereas that of *Salt-peter* is half Volatile: for the acid Spirits of this last not being sufficiently shut up by the Earth, by reason of the disposition of its Matrafs, therefore they are in a condition of separating more readily. Furthermore, we shall see afterwards, That all the acidity of *Salt-peter* may be extracted by distillation, which cannot be done with common Salt.

Spirit of Salt drawn without Earth. Some ways of drawing the *Spirit of Salt* without addition have been much sought after, but that is not yet well discovered. It is true indeed, Monsieur *Seignette*, an Apothecary of *Roche*, among other excellent discoveries that he hath made on Salts, to the knowledge of which he hath particularly applied himself, brought me hither a Sea-salt in the year 1672. that we distilled without addition of any thing else, by a very moderate fire, and in two hours time we drew three ounces and a half of very good Spirit, out of six ounces of Salt, that we put into the Retort. After this we broke the Retort, and having powdered the Salt that remained in it to the weight of two ounces and a half, we exposed it to the air in a pan

pan for a fortnight, and we found it re-impregnated with Spirits; we distilled it once more, and with the same ease as before, we drew half its weight in Spirit, of the same force as the former. The matter remaining in the Retort being again exposed to the air recovered new Spirits. Monsieur *Seignette* did assure me, that he had thus drawn Spirit from the same matter nine several times; which is a thing worth our admiration, and shews us very well that the Air contains a Spirit which forms diverse things according to the different dispositions of the subjects that it enters into. This Salt is particular to him that shewed it me, and he prepares it himself some way that he is unwilling to discover.

Since I writ of Monsieur *Seignette's* particular way of drawing *Spirit of Salt*, some have printed, that if common Salt well decrepitated, and kept a good while over the fire, were exposed to the Air for some days, and distilled without addition of any thing to it, it would yield a Spirit much like that I have spoken of, and in full as great a quantity. *Objection.*

But if we examine the sharp liquor which is drawn this way, we shall find it of so weak a nature, that it may more reasonably be called phlegm, than Spirit, and the Salt remain entire in the Retort; whereas Monsieur *Seignette's* Spirit of Salt is full as strong as common Spirit of Salt, and has the very same qualities, nay, I conceive it somewhat better, as not having so great an impression from fire as the other. *Answer.*

Again, some say, it does not deserve the name of Spirit of Sea-salt, nor ought this preparation to be look'd upon as any great mystery, because *Objection.*

the same incorporation and augmentation happens to divers other Salts exposed to the Air, after drawing off their Spirit.

Answer. I grant this augmentation proceeds from the Spirit of the Air, and I conceive it is the same Spirit which produces all manner of things according to the Matraſſes, or different pores of the earth it uſes to meet with, as I have explicated in my Remarks upon the Principles. But becauſe this Spirit of the Air has met with pores in our matter, ready diſpoſed to make a Salt much like unto common Salt, and a Spirit is drawn from it much like unto that which is drawn from common Salt, I ſee no reaſon to doubt why this Spirit ſhould not be a true *Spirit of Salt*; all the difference is this, the Salt I now ſpeak of is not ſo thoroughly united to its earthy part, as common Salt is, and therefore its ſpirits do ſeparate with more eaſe; for they are drawn without addition of any thing elſe, and with a gentle fire; whereas thoſe of common Salt are ſo fixt, that they can't be driven out, without mixing a great deal of earth in order to ſeparate all its parts, and without a very great fire.

As for the augmentation which happens to many other bodies expoſed to the air, after their Spirits are drawn off, I don't queſtion the matter of fact, nor that theſe ſame ſubſtances do return into what they were before, by impregnating again with ſpirits of the air in ſome conſiderable time; but it is rarely found that any of them do yield ſo ſtrong ſpirits, and ſo eaſily as our Salt, and here in lies the myſtery.

Acids drawn by Fire, differ from natural acids.

It is obſervable, That the acids which are drawn by ſo violent a fire do very much differ from thoſe that are made naturally, ſuch as the Vine-

gars

gars of Beer, Wine, Cider, the acid of Citron, &c. The *Spirit of Salt* among others hath some particular difference from the rest, because it will precipitate that which *Aqua fortis* hath dissolved. This acid, according as may be judged by its effects, is compounded of stronger, and more weighty points than the rest, but they are not so sharp and piercing. And this is the reason that it jogs so effectually those of *Aqua fortis* loaded with some bodies they have dissolved, and that shaking them about it makes them let go their hold.

Some have writ, That this precipitation must *Objection.* not be imputed either to the weight, or the strength, no more than to the agitation, which *Spirit of Salt* may have given to the *Aqua fortis*, or to matters dissolved, but rather to the conjunction of the acidity of this Spirit with the volatile and sulphureous alkali of *Aqua fortis*, or *Spirit of Nitre*, which does by that means constrain this last to abandon the metal which it had dissolved.

But this is the way to explicate, as they say, one *Answer.* obscure thing by another that is much more obscure; for what likelihood is there that the volatile spirit of *Aqua fortis* is an alkali? and pray how comes it to remain in so great a motion with the fixed acid Spirit of this same water without destroying or losing its nature, this is a thing that can never be conceived very easily. But furthermore supposing this Spirit were an alkali, it would be still necessary to explicate mechanically, for what reason this alkali does quit the body of the metal to betake itself to the *Spirit of Salt*; for to say merely that by the conjunction of these two Spirits the *Aqua fortis* is compelled to abandon the metal that it had dissolved, is nothing at all to

the clearing of the question, unless a man will needs give an intelligence to these Spirits. Wherefore we must still have recourse to the agitation and jostles, for the true reason.

It is also remarkable, that the effervescency which happens when *Spirit of Salt* is cast into the solution of some bodies by *Aqua fortis*, is different from that which happens when some alkali is cast into it, the former being much more gentle than the latter.

The *Spirit of Salt* dissolves leaf Gold, which *Aqua fortis* is not able to do.

When this *Spirit* is dulcified, it is mixed with *Spirit of Wine*, which being a Sulphur doth take off the edges of the acid, and in part hinders their motion; whence it comes to pass that this *Spirit* is milder by this addition, than if water had been used instead of *Spirit of Wine*.

The *Spirit of Salt* may be made with Salt decrepitated, after the same manner.

CHAP. XVI.

Of Nitre, or, Salt peter.

The Nitre
of the anti-
ents is
Salt peter.

IT is probable that the *Nitre* of the antients was either the *Aegyptian Natron*, or a Salt that is found in the earth in a gray compact mass, or else the natural *Borax*, or the Salt which is drawn from the water of the river *Nilus*, and many other rivers. And it may be, that all these Salts

Salts are divers kinds of their *Nitre*, but the *Nitre* of the moderns is nothing else but Salt-peter, and this is that of which I intend to speak.

Nitre is a Salt impregnated with abundance of *What Salt-Spirits* out of the Air which do render it volatile; *peter is.* it is taken from among the stones and earths of old ruined buildings. Some of it is likewise to be found in Cellars, and several other moist places, because the Air doth condense it in those places, and easily unites with the stones.

Salt-peter is also sometimes made by the Urine of Animals, falling upon stones and earths. Nay some have thought that all *Salt-peter* comes from that cause, whereas we see every day that some of it is taken out of places, where there never came any Urine at all. This Salt is half volatile, and half like unto *Sal Gemme*, as I shall prove hereafter.

The great and violent flame which happens so soon as *Salt-peter* is flung upon the coals, and the red vapours which it uses to yield when reduced into a Spirit, have induced the Chymists generally to believe that this Salt is inflammable, and consequently fully loaded with Sulphur, because Sulphur is the only Principle that flames; but if they had suspended their judgments herein, until they had got more experience on this Subject, they would not only have known that *Salt-peter* is not at all inflammable in its nature, but they would e'en have doubted whether or no any Sulphur does enter into the natural composition of this Salt; for if *Salt-peter* were inflammable of it self like Sulphur, it would burn where there is no Sulphur, for example in a Crucible heated red-hot in the fire; but it will never flame therein, use
what

*Salt-peter
not inflam-
mable.*

what quantity of it you please, and let the fire be never so great. It is true indeed, if you throw *Salt-peter* upon kindled coals, it makes a great flame, but this is only through the sulphureous Fuliginosities of the coals, which are violently raised and rarefied by the volatile nature of *Nitre*, as I shall prove in the Operation upon fixt *Nitre*.

No proof of Sulphur in Salt-peter. As for any Sulphur that is thought to be contained in *Salt-peter*, it can't be demonstrated by any Operation whatever: for the red vapours that come from it are no more inflammable than the *Nitre*, when they are not mixt with some Sulphureous matter; and it is far more probable, that this salt contains no Sulphur, if we consider its cleanness, transparency, acidity, and cooling quality, which have no manner of affinity with the effects of Sulphur, which are commonly to make a body opaque, to take off acidity, and to heat.

Purification of Salt-peter.

TO purifie *Salt-peter* is to deprive it of part of its fixt Salt, and of a little bituminous earth, which it contains.

Dissolve ten or twelve pounds of *Salt-peter* in a sufficient quantity of water, let the dissolution settle, and filtrate it, then evaporate it in a glass or earthen vessel, to the diminution of half, or until there begins to appear a little skin upon it; then remove your vessel into a cool place, stirring it as little as may be, and leave it there till the morrow, you'll find Crystals which you must separate from the liquor; evaporate this liquor again to a skin, and set the vessel in a cool place, to get
new

new Crystals; repeat the evaporations, and Crystallizations, until you have drawn all your *Salt-peter*.

Note that in the last Crystallizations, you'll have a Salt altogether like unto Sea-salt, or *Sal Gemme*, keep it apart, it may serve to season meat with.

The first Crystals are the pure *Salt-peter*.

You may, if you please, dissolve and purifie *Salt-peter* several other times in water, observing every time what I said before, for to render it more white, and purifie it from its Sea-salt.

Salt-peter purified is a great aperitive, it cools the body by fixing the humours that are in too much motion, and drives them by Urine. It is given in Fevers, in *Gonorrhœas*, and many other diseases; the dose is from ten grains to a drachm in Broth, or some appropriate liquor.

Fixt salt of Salt-peter.

Refined Salt-peter.

Vertue.

Dose.

Remarks.

The first Purification that is given to *Salt-peter* is this: The stones and earths that contain it are grossly powdered; they are boiled in a great deal of water, to dissolve the *Salt-peter*: the dissolution is filtrated, and then poured upon ashes, to make a *Lixivium*; after it hath been poured upon the ashes several times, it is evaporated and Crystallized.

First purification of Salt-peter.

The Salt of the ashes which does mix with the *Salt-peter*, increases its fixt part; but that which is made without ashes is the better to make *Aqua fortis* with.

The earth from whence *Salt-peter* hath been drawn, being set in the open air, and stirred about from time to time, doth re-impregnate with a kind of Salt.

The

The long Crystals that we see *Salt-peter* shoot into, do proceed from its volatile part, for that which is CrySTALLIZED last, is fixt like Sea-salt, and looks just like it.

Salt-peter can never be purified so well, but it will still contain a Salt like unto *Sal Gemme*, or sea-salt, but in less quantity than before.

How to fix
Salt-peter.

When *Salt-peter* is boiled a long time in water, and over a great fire, some part of the Spirits do fly away, and there remains at last nothing but a salt like unto sea-salt, or *Sal Gemme*, which serves to prove that *Salt-peter* is only a *Sal Gemme* fuller of Spirits than the other, as I said speaking of the Principles.

How to Cry-
STALLIZE
Salt.

When you would CrySTALLIZE a salt, you must dissolve it in a convenient proportion of water; for if there should be too much, the salt would be weakned too much, and not able to coagulate; and if on the contrary there should be too little, the Crystals would be confused. Therefore to make them fair, you must take your vessel off the fire, when you perceive a little skin upon the liquor, which is a mark to shew that there remains a little less liquor than is convenient to keep all the salt dissolved, and thus when it comes to be set in a cool place, it will not fail to fix.

Acid salts, and among them the volatile, do CrySTALLIZE in much less time than others.

How *Salt-
peter* cools
the body.

Salt-peter cools the body, by reason that being an acid it depresses the humours, which by their too great motion did heat the body, and so precipitates them by Urine; for the volatile salts, and sulphurs, that all bodies are full of, are easily fixed and quieted by acids.

Crystal

Crystal Mineral, called, Sal Prunellæ.

THIS Operation is a *Salt-peter*, from which some of the volatile part hath been separated, by the means of Sulphur and fire.

Bruise two and thirty ounces of purified *Salt-peter*, and put it into a Crucible, which you must set in a Furnace among burning coals. When the *Salt-peter* is melted, throw into it an ounce of flower of Sulphur, a spoonful at a time, the matter will presently flame, and the more volatile spirits of *Salt-peter* fly away: when the flame is over, the matter will remain in a very clear fusion. Take the Crucible out with a pair of tongs, and turn it upside down into a brass basin, very clean, and a little warmed before-hand, to dry up the moisture that might be upon it; shake about the basin to spread the matter while it is cooling, and this is called *Sal Prunelle*, of which there will be twenty eight ounces. If you desire to have it very pure, you must dissolve it in a sufficient quantity of water, filtrate the dissolution, and crystallize it, as I have said in the Purification of *Salt-peter*. *Purification.*

It is accounted better than purified *Salt-peter* for Physical uses, because the Sulphur is thought to have corrected it. It is given to cool, and to work by Urine, in burning Fevers, in Quinsys, Gonorrheas, and other diseases, that proceed from heat, and obstruction: the dose is from ten grains to a drachm in Broth, or some other liquor appropriate to the distemper. *Vertue.* *Dose.*

Remarks.

Remarks.

Why called
Sal prunel-
lar.

This Preparation is called *Sal*, or *Lapis prunella*, either because the essential salt which is drawn from *Prunella*, or, *Self-heal*, hath, near upon the matter, the same vertue and figure as *Cryſtal Mineral*, or else because it is given in hot Fevers, whose heat is compared to that of a burning coal called *Pruna*. The *Germans* do give it the form of a *Sloe*, after having coloured it red with *Rose*. *Salt-peter* is more easily dissolved than sea-salt, because it contains less earth.

Purified
Salt-peter
is better
than the
Cryſtal
Mineral
in Physick.

The Antients have thought it necessary to throw *Flowers of Sulphur* on melted *Salt-peter*, to the end it might be made the more Aperitive; but thereby it is deprived of the more opening Spirits which the *Sulphur* carries away along with it; thus instead of rendring it more open, and effectual, the better part of it is lost.

It is easie to perceive that this abuse is one of those that hath insensibly gained upon men, and diminishes very much from the benefits that might be received from Chymical Physick, for want of applying themselves to examine well the constituent parts of natural things, before proposing of correctives. I shall rather advise them to use simple purified *Salt-peter*, or purified from its first salt three or four several times, so as I have described, and I am confident, after the experience that I have often made of it, that it will better satisfy the intentions of those who use it, than when it shall have been prepared with *Sulphur*.

The diminution which is made of the *Salt-peter*, is not only of the volatile parts which are carried off

off with the Sulphur, but it is likewise of the watry part which this salt does always contain, and which does hereby evaporate.

Crystal Mineral is often counterfeited, by mixing *Roche-alom* with it during the fusion, and if those men do use a *Salt-peter* that is not very pure, this *Alom* does serve to purifie it, by causing a thick scum to separate to the sides of the Crucible, and so the *Crystal Mineral* becomes much the whiter.

Crystal Mineral
often counterfeited,
and how to know it.

This adulteration may be known, in that the *Crystal Mineral* made this way is more glittering than the other, and it is the *Alom* which gives it this colour.

Those who carry about this *Crystal Mineral* to the shops do easily enough vend it for its outward excellency, and for the cheapness they sell it at; for *Alom* costs but little, but this sort wants a great deal of having so good effects as the other.

Sal Polychrestum.

THIS Operation is a *Salt-peter* fixed by Sulphur, and by fire.

Powder and mix equal parts of *Salt-peter*, and common Sulphur, throw about an ounce of this mixture into a good Crucible, which you shall have heated red-hot before-hand, there will rise a great flame, which being over, throw into it as much more of the matter, and continue to do so, until all your mixture is used. Let the fire continue four or five hours, so as to keep the Crucible all the while red-hot, then pour out the matter into a copper well dried by the fire, and when it is cold,

cold, powder it and dissolve it in a sufficient quantity of water; filtrate the dissolution, and evaporate it in an earthen pan or a glass vessel, in sand until it is dry. You must fling away as insignificant that which remains in the filter.

Purification of Sal Polychrestum.

If the *Salt* be not altogether so white, as we would have it, it is because it still retains some Sulphur; therefore you must calcine it in a strong fire in a Crucible, stirring it about with a Spatule three or four hours, or until it becomes very white; then repeat your dissolution in water, your filtration and evaporation; thus you have a *Sal Polychrestum* exceeding pure.

Virtue.

Sal Polychrestum purges serous humours by stool, and sometimes by Urine: the dose is from half a drachm to six drachms in some proper liquor.

Dose.

Remarks.

Etymology of Polychrestum.

This *Salt* is properly a *Salt-peter* divested of its volatile part by Sulphur, it is called *Polychrestum* from the Greek word Πολύχρηστος, that is to say, good for several uses, because it is used not only to purge by stool, but by urine too, being taken to the weight of one or two drachms in a quart of water in the morning like a Mineral water. It is commonly used in Infusions of *Senna* from one scruple to four, as well to increase the strength of the Purgative, as to draw out more strongly the Tincture of *Senna*. Some do give it to six drachms in a pint or a quart of water, to purge strongly; but I would not advise any body to use this Purgative all alone, by reason of the vellications that it gives in passing through the stomach.

Sal

Sal Polychrestum must by no means be used until it is made very white, and very pure; for when there remains any gross portion of Sulphur, it is apt to cause *Vertiges*, stupefaction of the Nerves, and nauseousness of the stomach.

If you used sixteen ounces of purified *Salt-peter*, and so much Sulphur in this Operation, you'll have at last but three ounces and a half of *Sal Polychrestum* very fine; but if you use common *Salt-peter* instead of purified, you'll have five ounces of *Polychrestum* as white as the other.

This difference of weight proceeds from common *Salt-peters* containing more fixt Salt than purified *Salt-peter*.

Sal polychrestum may be Crystalliz'd like *Salt-peter* and other Salts. Its Crystals are very small, and much like those of sea-salt, but only they are keener.

Monsieur *Seignette* an Apothecary of *Rochell* whom I have spoke of before, hath put in use a certain *Sal Polychrestum*, which seems at first to be like unto this, but when it comes to be examined, there's found a notable difference, as well in the Crystallizations, (and when it is thrown into the fire) as in the effects; for whereas six drachms of this sort taken, as I have said, do cause gripes in pricking the membranes of the stomach, that of *Monf. Seignette* in the same quantity doth purge very gently without any gripes at all, as he proves in a little Treatise that he hath made touching the uses of this *Polychrestum*. And the truth of it I have found my self in several persons. The composition of this Salt is known to none but himself, who having given it a reputation in the chiefest Towns of *France*, hath left some quantity of it with me to distribute, and make use of here at *aris*.

B b

Spirit

Spirit of Nitre.

Spirit of Nitre is a liquor very acid and corrosive, drawn from *Salt-peter*.

Powder and mix well together two pounds of fine *Salt-peter*, and six pounds of *Potters Earth* dried; put this mixture into a large Retort, either of earth or glass luted, set it in a close Reverberatory Furnace, fit to it a great capacious *Balon*, or Receiver, and give a very little fire to it for four or five hours, to make all the phlegm come forth, which will distil out drop by drop. When you perceive there will distil no more, throw the Phlegm away that is found in the Receiver, and having refitted it, lute the junctures, and encrease the fire by little and little to the second degree, there will come forth Spirits, which will fill the Receiver with white clouds; then keep the fire two hours in the same degree, after that encrease it to the greatest violence you can give it, and so the vapours will come red; continue the greatest fire till there come no more, the operation will be ended in fourteen hours. When the vessels are cold, unlute the junctures, and pour your *Spirit of Nitre* into an earthen bottle, which you must stop with Wax.

Spirit of Nitre is used for the dissolution of metals, it is the best *Aqua fortis* that is; and the corrosive vertue of other waters of this nature doth chiefly proceed from the *Nitre* that enters into their composition.

Remarks.

Remarks.

You might, as some do, mix four parts of Potter's earth with one part of *Nitre*, when you would draw its Spirit, but you will succeed better, and with less difficulty, by observing my description; for whereas the earth does here serve only as an *intermediary* to separate the parts of this Salt, to the end that the fire operating more easily upon it may draw its Spirits, it is a very needless business to use more of the earth than is necessary towards this effect. Besides, this over great quantity of earth may serve to weaken the Spirits, and by taking up too much room may hinder the drawing so much as otherwise you would with the same Retort.

I fling away the Phlegm, because it only serves to weaken the Spirit. The white vapours do proceed from the volatile part of *Salt-peter*, and are a weaker sort of Spirit; but the red ones do come from the fixt part, and are the strongest Spirit: for which reason the fire is made so very violent towards the latter end. This fixt Spirit is commonly called *Salamanders blood*. Of all Salts, *Nitre* is the only one that yields red vapours. Salamanders blood.

When you use here the best *Salt-peter*, there remains nothing in the Retort but only earth.

I have boiled several times in water a good while, the earth that remained after the distillation of the *Spirit of Nitre*, and after evaporation of the filtrated decoction, I could find no salt at bottom.

I have likewise observed, that out of two *Quantity* pounds of purified *Nitre*, a pound and fourteen ounces

B b 2

ounces

ounces of liquor, in Phlegm and Spirit may be drawn.

A third part of the Retort, wherein the operation is performed, must remain empty, and the Receiver must be very large; for otherwise these Spirits coming hastily forth would break all to pieces for room to move in.

Spirit of Nitre Dulcified.

THIS Operation is a *Spirit of Nitre*, whose more subtle edges have been broken, or evaporated.

Put into a large Bolt-head eight ounces of good *Spirit of Nitre*, and so much Spirit of Wine well dephlegmated; set your Bolt-head in the Chimney upon a round of straw, the liquor will grow hot without coming near the fire, and half an hour or an hour afterwards, it will boil very much; have a care of the red vapours that come out apace at the neck of the Bolt-head, and when the ebullition is over, you'll find your liquor clear at bottom, and to have lost half what it was; pour it into a Viol and keep it, this is the sweet *Spirit of Nitre*.

Vertue.

It is good for the wind Colick and the Nephritick, for Hysterical distempers, and for all Obstructions; its dose is from four to eight drops in broth or some other convenient liquor.

Dose.

Remarks.

You must leave the Bolt-head open; for the vapours would either carry away the stopple, if there were

were one, or else they would break the vessel; the Bolt-head is so hot during the ebullition, that one can't endure ones hand upon it.

The heat and ebullition begins sooner or later, according as the Spirits that are used have been more or less dephlegmated; or else according as the season, in which it is made, is either hotter or colder, for in the winter you must warm the liquor in a gentle sand-heat, and when it grows a little hot, you must take it off, and shake it, thus it will come to boil.

This effect is very strange, for *Spirit of Nitre* Ebullition without an Alkali. being a strong acid, and Spirit of Wine a sulphur, it can't be said that there is here any alkali, to cause the ebullition with acid, according to the common maxim. And this Operation shews us that every thing can't be explicated by the sole Principles of acid and alkali, as some do pretend.

This Operation has much resemblance with that which happens when Oil of Turpentine is put into a bottle with Oil of Vitriol; for the mixture of these liquors does heat and boil much alike. I shall say something of this last mixture hereafter. There is this difference notwithstanding, that *Spirit of Nitre* being more volatile than Oil of Vitriol, causes a greater enervescency.

In order therefore to explicate this ebullition, *Spirit of Nitre contains fiery parts.* two things must be considered. First, That *Spirit of Nitre* contains a great many fiery parts lock't up in its acidity, but which do still retain some evident motion, for it is they that make the *Spirit of Nitre* to Fume as it does.

The second is, That *Spirit of Nitre* is more inflammable than *Salt-peter*, when mixed with any sulphureous body; and the reason thereof is,

B b 3

that

that it is more rarefied than *Salt-peter*.

Thus when this acid Spirit is mixt with Spirit of Wine, which is a sulphur very much exalted, and very susceptible of motion, the volatile part of the *Spirit of Nitre* joyns itself to this sulphur, and the mixture becomes very ready to take flame; likewise after this mixture the fiery bodies that were in *Spirit of Nitre*, do by striving to mount upwards put the liquor into so great a motion, that it e'en almost flames, and would without all question quite flame, if there were not some phlegm always mixed with these Spirits, let them be drawn never so pure, which serves to allay the activity of the fiery particles; so that there must needs follow a very great ebullition.

*Cause of the
effervescen-
cy.*

This effervescency therefore proceeds from this, that Spirit of Wine, and Spirit of *Nitre*, which are as it were a *Salt-peter*, and sulphur highly exalted, have been almost kindled into a flame by the fiery bodies that were in Spirit of *Nitre*; and that which further proves this conception is, a noise or kind of detonation, during the effervescency, which is much like that which happens when sulphur and *Salt-peter* are burnt together.

*What is
meant by
fiery bodies.*

But because there may be some difficulty in conceiving what is meant by little fiery bodies, I do understand by them a subtle matter which having been put into a very rapid motion does still retain the aptitude of moving with impetuosity, even when it is inclosed in grosser matters; and when it finds some bodies which by their texture or figure are apt to be put into motion, it drives them about so strongly that their parts rubbing violently the one against the other, heat is thereby produced.

Now

Now the sulphureous parts of Spirit of Wine, and the volatile acids of Spirit of Nitre being mixed, and being very aptly disposed for motion of themselves, they must needs be easily put into it by these fiery bodies, insomuch that their parts often rubbing or striking the one against the other, they must cause a heat after the same manner, as when a stone is strook hard against a piece of Iron, a heat and fire do follow.

How the liquor becomes better

But it may be objected, That there should be no fermentation, where there is no division nor separation of the parts of some body by another matter more subtle and more agitated than it self, which doth not happen here; for the Spirit of Wine, the Spirit of Nitre, and the igneous bodies are all three very subtle; and it does not appear, that they can resist one anothers motions.

Objection,

To this objection, I answer, That altho' the Spirit of Wine and Nitre are very subtle, yet they make a kind of imperceptible Coagulum by the rencountering of their insensible parts, as it always happens in the mixture of sulphur and acids: for the ramous parts of the spirit of Wine close with the points of the spirit of Nitre, and so temper one anothers motions: But the igneous bodies, which are shut up in this Coagulum, not having a free motion, they act strongly on all the sides of their little prisons, and at last break them by rarefying the liquor.

Answer,

The great diminution of the liquor proceeds from the evaporation of the more volatile parts of the spirit of Wine and Nitre, through the neck of the Bolt-head during the ebullition.

Cause of the diminution.

That which remains is a well sweetned spirit of Nitre, for not only its edges are very much blunted

How the spirit of Nitre is sweetned.

blunted in the ebullition, but the spirit of Wine being a sulphur does unite and imbody with those that remain, so that they have no longer any Corrosive quality.

How it comes to change its bad scent into a good.

The Spirit of *Nitre*, before its dulcification, has a strong disagreeable odour, which raises a pain in the head by the red corrosive Fume which continually exhales from it, and which, by the means of its igneous parts, irritates the olfactory nerve: But as soon as this spirit has been sweetned, it smells very pleasantly and agreeably, because the igneous particles have evaporated in the ebullition, and that the acids have been blunted, or shut up into the ramous parts of the spirit of Wine, so that the red fume ceaseth, and there only ariseth a sweet exhalation, which tickleth and gently moveth the organ of smelling.

Aqua fortis.

THIS preparation is a mixture of the Spirits of *Nitre* and *Vitriol*, drawn by fire, to dissolve metals.

Powder and mix *Salt-peter* purified, *Vitriol* calcined white, as I shall shew hereafter, and *Porters* earth, or clay dried, of each two and thirty ounces: put this mixture into an earthen Retort, or glass one luted, whose third part is to remain empty; place your Retort in a close Reverberatory Furnace, and fitting to it a capacious Receiver, lute well the junctures: then begin by giving a little fire to warm gently the Retort, and encrease it by little and little; but when you perceive

cive the Spirits to come forth into the Receiver in red clouds, continue it for eight or nine hours in the same degree, then drive it to the last extremity, untill there do appear white clouds instead of red. Then let the vessels cool, and unlute them, you'll find in the Receiver four and thirty ounces of *Aqua fortis*, which you must keep in an earthen bottle well stoppt. It serves for the dissolution of metals. Virtue.

Remarks.

I do use to Calcine the Vitriol to a whiteness, that the *Aqua fortis* may not be weakned with an insipid water.

The mixture of Vitriol and Salt-peter has quickly some smell of *Aqua fortis*, because Vitriol contains a great deal of Sulphur, which easily insinuates into the volatile part of Salt-peter, and exalts some little of it, which causes the smell; it is this Sulphur in Vitriol which by volatilizing the red spirit of Nitre, makes it come forth faster, and with a less fire, than when Salt-peter is distilled with Clay alone. Aqua fortis distilled with less fire than the spirit of Nitre.

The greatest Corrosion of *Aqua fortis* proceeds from the Nitre, for the Vitriol doth yield but very weak Spirits in comparison with the other. I do acknowledge indeed that the Oil of Vitriol is exceeding Corrosive, but eighteen or twenty hours are not able to drive that out, for it doth not use to come until after three days continual distillation. The Vitriol then and the Clay do serve here only for a matter to separate the Salt-peter, that it may by the means of fire, the better rarefie into Spirits. For the parts of Nitre are so closely united Aqua fortis has its Corrosive quality from Nitre. Why Vitriol and Clay are mixed.

united that it would never yield spirits, if it were not mixed with some Terrestrial matter.

Although there does not enter into this preparation so much terrestrial matter, as there does into that of *Spirit of Nitre*, nevertheless it proves very well, because the Sulphurs of *Vitriol* do help the Spirit to rise.

If you would keep on the fire five days and nights together, the Receiver would be still full of clouds, because the *Vitriol* would yield some Spirits during all that time.

Sometimes *Alom* and *Arsenick* are added to the composition of *Aqua fortis*, but the description which I have given you is the best of all.

Both *Aqua fortis* and the Spirit of *Nitre* do always send forth Phlegms when they are well dephlegmated; but *Aqua fortis* doth it most, because of the Sulphur of *Vitriol* with which it is mixed.

There remains in the Retort sixty two ounces of a red mass, which may be used like *Colcothar* for an Astringent.

This mass may be obtained without breaking the Retort.

Fixation of Salt-peter into an Alkali Salt, by the means of Coals.

THis operation is a *Salt-peter* rendered porous by Calcination, and by the ashes of coals, which are mixed with it.

Melt sixteen ounces of *Salt-peter* in a strong and large Crucible among burning coals, throw into

it a spoonful of coals grossly powdered, and there will rise a flame and detonation, which being over, throw so much more, and continue to do so until the matter flames no longer, but remains fixt in the bottom of the Crucible; then pour it into a warm mortar, and when it is cold, powder it and dissolve it in sufficient quantity of water; filtrate the dissolution through brown paper, and evaporate all the water in an earthen pan in sand, there will remain a very white salt, which you must keep in a Vial well stopd.

This Salt hath a taste like to that of Salt of Tartar, and they differ but little in virtue; it opens Obstructions, and works by Urine, and sometimes by Stool; the dose is from sixteen to thirty grains in some convenient liquor.

It may be used to assist in drawing forth the Tincture of Senna, a red Tincture may be also drawn from it with Spirit of Wine, as from Salt of Tartar.

If this Salt is set in a Cellar, it dissolves into a liquor like the Oil of Tartar: it is used to extract the Tincture of Vegetables and Minerals.

Remarks.

The Crucible must be but half full of Salt-peter, because the detonation is so great, that the matter would be driven out of the Crucible, if too much be put in. When the Crucible is not very strong, it breaks in pieces about the middle of the operation, and some part of the matter is lost thereby.

This detonation is more violent than that which is made with a mixture of salt peter and common Sulphur, because the Sulphur of Coals is more rarefied than common Sulphur.

Detonation.

Dose.

Aliquot of fixed Nitre.

Nitre

*Cause of the
detonation.*

*Salt-peter
not inflam-
mable.*

Nitre will never flame, when set over the fire alone in a Crucible, though you make your fire never so strong, and coals though loaded with fuliginous or oily parts, do send forth but only a small blue flame; but when these two bodies come to be mixt together, the volatile parts of *Nitre* joyning with the coals, which are oily, do rarefie and exalt the coals with such violence, that they produce a very great flame. Now this operation confirms my opinion that *Salt-peter* does only serve here to rarefie the flame of sulphur, but cannot send forth the least flame of itself; because that as soon as ever the coals, you put into the Crucible, are burnt, the flame goes out, and appears no more untill you throw in more coals, with which a convenient proportion of the volatile parts of *salt-peter*, that still remained, does joyn and rarefie them into a flame. Thus new coals are successively thrown into the Crucible, untill it flames no longer; but toward the end of the operation, because there remain but few volatile parts in the *Nitre*, the detonation is much the less, and so is the flame, untill at last the coals finding nothing more in *salt-peter* for it to raise, do burn only as they use to do when alone.

Quantity.

If you use common *salt-peter* for this operation, you'll have occasion to use but three ounces and a half of coals, and you'll get twelve ounces of purified salt; but if you use fine *Salt-peter*, you must have seven ounces of coals, and yet will get but three ounces of purified salt.

This difference of weight proceeds from the fine *salt-peters* containing more volatile parts than the other; likewise a great deal more coals is required to raise them, and there remains the less *fixt salt* for the same reason. The

The *fixt Nitre* being prepared as I have described, it is a little grey coloured; now to make it white you must Calcine it in a great fire, stirring it in the Crucible all the while with a *spatule*; when it shall have continued red hot for above an hour, it will become exceeding white. You must then dissolve it in water, *filter* the dissolution, and evaporate the water, and thus you have a very pure and white salt.

This salt is an alkali, being a mixture of the salt of coals, which is an alkali, and *fixt salt-peter*; these two salts are so strictly united and mixed together in the Calcination, that they make a porous salt, and such as is much like unto the *fixt salt* of Plants.

Not that there is an alkali salt in *salt-peter* as Chymists will have it; for give what Calcination, or other operation you please to this mineral salt, without adding any thing to it, not the least alkali can be drawn from it, and all that ever we can see in it is acid.

It is further observable, that the liquor of *fixt Nitre*, which has been made with common *salt-peter*, being kept a year, or a year and a half, loses most of its activity as an alkali, so that it is no longer able to cause any such ebullition with acids, as it could before.

This accident can have no other cause, than that the pores of salt contained in the liquor do close up by little and little, and the acid salt of *Nitre* does absorb and destroy the alkali, which kept the pores open.

But the same thing does not happen, where the liquor of *fixt Nitre* was made with *purified salt-peter*; because whereas a great deal of coals was used

used in the fixing it, and but little salt of Nitre remained in it, the alkali must there predominate so powerfully, that the acid is not able to regain its strength.

Alkahest.

Some Chymists have thought fit to call the liquor of fixt Nitre, *Alkahest*, that is, an universal dissolyent, thinking it able to draw out the sulphureous substance of all mixt bodies.

Nitre fixed
without ad-
dition is an
Alkali, and
why.

If you Calcine, on a great fire, two and thirty ounces of common *Salt-peter*, without any addition or mixture, for eight hours together, there will be neither inflammation nor detonation, because there is no Sulphur in it, but the *salt-peter* will be so much diminished, that there will only remain two ounces and a half. This salt thus Calcined will burn a little when thrown upon kindled Coals, which shews, that all its volatile part is not evaporated: It is nevertheless an alkali, because the Igneous particles, by passing and re-passing into its pores, have turned it into a kind of *Calx*.

Liquor of
fixt Nitre.

If you set this salt to dissolve in a Celler, you shall have a liquor of *fixt Nitre* which may be used as the former, but it is esteemed better for cleaning the face.

CHAP. XVII.

Of Sal Armoniack.

Sal Armoniack is either Natural or Artificial. Sal Armoniack
 The Natural is found in very hot Countries, Natural.
 such as many parts of *Africa*, that are near the *Torrid Zone*. It is found upon the earth that hath imbibed the Urine of Animals, that is to say, where the Sun hath sublimed the volatile Salt of this Urine, and made of it a *Sal Armoniack*.

The Artificial *Sal Armoniack* is made at *Venice*, Artificial.
 and divers other places with five parts of Urine, one part of *sea-salt*, and half a part of *Chimney soot*; these three are boiled together, and reduced into a mass, which being put into subliming pots, over a gradual fire, it sublimes into a Salt in the form we commonly see *Sal Armoniack*. Now in this sublimation the volatile alkali salts of the *Soot* and *Urine* do raise up as much *sea-salt* as they can, and do joyn so strictly together with this acid salt, that the mixture seems to be fixt. The reason of this close union is, that *sea-salt* being in form of points, does insinuate into the alkali salts; and because it hath not motion enough to separate the parts of these salts, it gets within them, and fills their pores.

If you would purifie *Sal Armoniack*, you must Purification.
 dissolve it in a sufficient quantity of water, filtrate the dissolution, and evaporate it until it is dry in a glass vessel. You'll have a white salt, which may be

- Dose.* be given from six to four and twenty grains in some convenient liquor. It is an excellent Sudorifick and Diuretick; it is good in Malignant Fevers, and in Quartan Agues, and to bring the *menfes* in Women. It is also used in some *Collyries*, or waters for the eyes.
- Vertue.*

Flowers of Sal Armoniack.

THESE *Flowers* are a part of *Sal Armoniack*, raised by fire.

- Powder and mix together equal parts of *Sal Armoniack* in powder, and *sea-salt* decrepitated; put this mixture into an earthen Cucurbite, and having placed it in sand, fit to it a Blind-head. You must give a gentle fire at first, and encrease it by little and little, so long as you perceive the *Sal Armoniack* to rise up like meal, and stick to the head, and the uppermost part of the Cucurbite: continue the fire, until nothing more rises up, then let the vessels cool; lift up the head gently, and gather your *Flowers* with a Feather; keep them in a Viol well stoppt; they have the same vertue as *Sal Armoniack*, but are given in a little less dose, as from four to fifteen grains.
- Vertue.*
- Dose.*

Remarks.

This operation is performed, to the end the *Sal Armoniack* may be volatilized, by checking some part of its fixt salt by the addition of *Salt decrepitated*: thus these *Flowers* are a little more active than the *sal Armoniack*, though they are both compounded of the same Salts.

Iron

Iron or Steel powdered may be used instead of sea-salt, as *Schroder* describes it, and then the *Flowers* do become of a Yellow colour, because the Salts do take the *Tincture of Mars*.

And these last *Flowers* are a little more penetrating than the others, because Iron like an Alkali, disingageth the *sal Armoniack* from a part of its acids, which may be easily discerned by its favour.

Flowers of
Sal Armo-
niack with
Iron or
Steel.

*Other Flowers of Sal Armoniack, called,
Eus Veneris.*

THIS Preparation is a *Sal Armoniack*, impregnated with the most fixed part of *Cyprus Vitriol*, and exalted by the Fire into a powder.

Calcine, by a good Fire in an earthen pot tinglazed, two or three pounds of *Cyprus Vitriol*; until it have a dark red colour, then cast it into hot water, leaving it to steep there for some hours: And when the liquor is at rest, pour it off by inclination. Wash the matter several times with new hot water, to take away its salt as much as is possible, and to sweeten it: dry it and powder it, mix it carefully with an equal quantity of the powder of *Sal Armoniack*: put the mixture into an earthen Cucurbite so large that the mixture may only take up the third part of it: fit to it a Blind-head, lute the conjunctions, and place the vessel in sand, and by a gradual fire, which must be continued seven or eight hours, and then there will be raised up to the head yellow Flowers; afterwards leave the vessel

Ec

fels

sels to cool, unlute them, gather these yellow Flowers, and keep them in a bottle.

Vertue.

They are sudorifick, aperitive, attenuating, and are much esteemed for the Epilepsie, Scurvy, the King's Evil, and malignant Fevers. The

Dose.

Dose is from six grains to a scruple.

Remarks.

The Pot in which the *Vitriol* is calcined must not be glazed within, lest some of the Lead come off and mix in the *Colcothar*.

In the beginning of the Calcination there evaporates only the phlegmatick part, but afterwards very much Sulphur.

Salt of Vitriol of Cyprus and its vertue.

The Pot is commonly crackt in many places after the Calcination. It must be broken, and the *Vitriol* must be separated from it by a Hammer as well as possible; and what cannot be so separated, will be parted by the means of hot water.

If the Lotions after filtration be evaporated, there will be found at bottom, a very stiptick acid Salt, good to stop blood, if applied outwardly.

The Earth of the Vitriol of Hungary.

The red matter which remains will be very sweet, but it also contains a Salt mixed with some Earth. It is called the Earth of the *Vitriol* of Hungary. It must be well dryed in the Sun, or at a Fire, that it may easily be beat into powder, and that it may not give any moisture to the *Sal Armoniack*. The *Vitriol* calcined and sweetned in this Operation produces the same effect, which Salt decrepitated, or the powder of Iron did in the former; for it detains the more fixed parts of the

the *Sal Armoniack* at the bottom of the Cucurbite : but the Flowers raise with them some parts of its substance, seeing they are of a yellow colour.

If the Flowers do rise White, they must be mixed over again with the Mass which is at the bottom of the Cucurbite, and they must be sublimed the second time after this same way. But I always rendered them yellow by one sublimation.

These Yellow Flowers are called *Ens Veneris* ^{Whence the} by reason of some Copper particles which they ^{name of} have carry'd away from the *Vitriol of Cyprus* ; for *Ens Veneris* signifies the soul or essential part of ^{ris.} Copper.

There is found at the top of the Cucurbite a part of *Sal Armoniack* sublimated, half White, half Yellow : If this be mixed again with what is at bottom, and the matter acted by a great fire, there will rise new yellow Flowers, which have not much less vertue than the former.

Aqua Regalis.

THIS Water is a solution of *Sal Armoniack* in *Spirit of Nitre*.

Powder four ounces of *Sal Armoniack*, and put them into a matras, or other glass vessel of a good bigness ; pour upon it sixteen ounces of *Spirit of Nitre*, place the vessel in sand a little warm until the *Sal Armoniack* is all dissolved, then pour the dissolution into a bottle, and stop it with ^{Quantity} wax, this is *Aqua Regalis* ; you will have seventeen ounces of it.

C c 2

Remarks

Remarks.

Aqua sty-
gia, or
Chryfulca.

This water is called *Regalis*, or Royal, because it dissolves Gold, which is the King of metals. It is likewise called *Aqua Stygia*, or *Chryfulca*.

The vessel in which it is made must be of a sufficient bigness, because in the dissolution the Spirits do rarefie with so much violence, that they would break it, if they had not room to circulate in; when a great deal of this water is preparing at a time, you must take care to remove the vessel from the fire, so soon as the dissolution begins.

The diminution of three ounces is caused by the volatile parts of the Spirit of *Nitre* and *Sal Armoniack*, which evaporate thro' the neck of the Matrafs during the Ebullition.

Another
way of ma-
king Aqua
Regalis.

Aqua Regalis may be likewise made, with equal quantities of *Salt-peter*, and *Sal Gemme*, by mixing these Salts with thrice as much Potters earth powdered, and the distillation of it is made after the same manner as I shewed, to draw the Spirit of *Nitre*.

How Aqua
Regalis
dissolves
Gold and
not Silver.

It is somewhat difficult to conceive how *Aqua Regalis* is able to dissolve Gold, which is a most solid Metal, and cannot dissolve Silver, which is a much less solid body. Some Chymists endeavouring to resolve the difficulty, have said that Gold being a metal fuller of Sulphur than Silver, did therefore require a sulphureous dissolvent, such as *Aqua Regalis*, compounded of the volatile sulphureous salts of *Sal Armoniack*; but this explanation destroys itself, for if Gold did contain more Sulphurs than Silver, it would consequently be less weighty, for *Sulphur* is one of the lightest Principles in Chymistry.

I know

I know the Alchymists will tell me, That their Sulphur is quite of a different nature from the common sort, and that they do conceive in Gold, a fixt, and consequently a heavy sulphur. But besides that a fixt sulphur is a thing meerly imaginary, it can never be so heavy as the other principles which they pretend to be in Gold, and which they are forced to think as fixed as the Sulphur.

Moreover if we examine what happens in the composition of the dissolvent of Gold, it will be no difficult matter to contradict this opinion: for we see that as soon as ever the *Spirit of Nitre* begins to work upon the *Sal Armoniack*, the acid salt joyns with it, and quits the volatile salts, which finding themselves disengaged from the bodies that held them in a manner fixed, do rise up with violence; but because these salts which are alkalies do meet in their passage with some acids of the *Spirit of Nitre*, the great effervescency happens which is always wont at the meeting of alkali salts and acids. This effervescency being over, our *Aqua Regalis* remains in the vessel: it is properly nothing else but an acid sea-salt dissolved in *Spirit of Nitre*, the volatile salts being either exalted, or destroyed by acids, and that which confirms this opinion is, that *Aqua Regalis* is as well made with sea-salt, in which there are no volatiles at all, as with *Sal Armoniack*, according as I have said.

It is not then by discourses of this nature, that this *Phenomenon* can be clearly explicated. I am apt to believe, with more likelihood, that if *Aqua Regalis* be not able to dissolve Silver, the reason of it is because the edges of the *Spirit of Nitre* being magnified by the addition of Salt do slide over the pores of Silver, not being capable to

The force of Aqua Regalis is not from the Volatile Salts.

Dissolves all according to the different pores they meet with.

enter into them by reason of the disproportion of their figures, whereas they easily enter into Gold, whose pores are larger, to make their divisions. On the contrary if the *Spirit of Nitro* dissolves Silver, it is because its points are very subtle and fitly proportion'd to enter into the small pores of this metal, and by their motion to divide its parts. These same points may likewise enter into the large pores of Gold, but they are too small and pliable to act upon this body. There's need of stronger and keener knives, which by filling its pores more advantageously may have force enough to divide it.

Objection.

I do easily foresee, it will be objected, that Gold being heavier than Silver, should have lesser pores and not greater, because the weight of a body doth only consist in the proximity of parts; but it is easie to solve this difficulty, by considering each metal with a good Microscope: for the pores of Gold are seen to be much larger than those of Silver, though indeed there are much fewer, and that will explicate very well why Gold is heavier than Silver, though its pores are greater; for seeing they are at a good distance the one from the other, there's a very compact matter as it were intercepted, which causes all the weight; but the pores of Silver being very near one another, and of a much greater number, do intercept less solid matter, and consequently it must be lighter. I'll use a familiar example, to make my self more plainly understood.

Experiment.

If you take two vessels of the same size and bigness, and fill one with small hail-shot, and the other with large bullets, that which holds the bullets will be much heavier than that which is full

of shot; and yet notwithstanding the vacuities between the bullets are much larger, than those between the shot.

According to this *Hypothesis*, reason may be likewise given, why Gold is cut in pieces more easily than Silver; for the greater the pores of a body are, the easier entrance will a pair of Sheers meet with.

Gold spreads under the Hammer more than Silver, because having larger pores the Hammer makes a greater impression into it, and dilates the parts the more easily.

It is objected, That if there be any heavy matter as it were intercepted between the pores of Gold, it must needs precipitate of it self, after the action of *Aqua Regalis* upon this metal, which is a thing that does not happen.

I answer, That if the parts of Gold are heavy, the dissolvent nevertheless is a gross body, and very well proportioned to hold up those heavy parts, and to hinder them from precipitating.

Others have opposed this explication, and have writ, that if *Aqua Regalis* dissolves Gold, and cannot dissolve Silver, the reason of it is, that the gross points of *Spirit of Nitre*, or *Aqua fortis* are subtilized by the mixture of *Sal Armoniack*, and are rendered fit to enter into the small pores of Gold, whereas the delicate Fabrick of these same points does not leave them the necessary strength nor motion to divide the parts of Silver, whose pores are a great deal bigger.

But this way of arguing does not agree with experience; for what likelihood is there that the points of *Spirit of Nitre* are so subtilized by the penetration and division of the parts of *Sal Armoniack*?

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niack?

niack? or where shall we find any example, that after a considerable effervescency of two salts met together in conflict, the acidity grows sharper than it was before? this is a thing that can never be proved. On the contrary, every body knows well enough that no effervescency happens but the acid is in part blunted or broken thereby. Moreover the Argument supposes that *Spirit of Nitre* does break its subtlest points in violently contending with the *Sal Armoniack*, since also that in *Sal Armoniack* there are alkali Salts whose property it is to destroy acids. I could further add here, that the conjunction of Salt with *Spirit of Nitre* should of necessity render its points more gross than they were, and that the Crystals which are drawn by *Aqua Regalis* have their shape not so keen as those that are drawn by *Aqua Fortis*. But that which I have said is so probable in itself, and so easie to be convinc'd of, if a man takes never so little pains to consider it, that I should but amuse my Reader to little purpose, if I should offer to give any proofs of it.

Neither do I find it convenient to make a long discourse in explicating how Silver, which has lesser pores, is more susceptible of the impressions of Air and Fire, than Gold which has larger, seeing I have already supposed that the matter intercepted between the pores of Gold is more compact, and consequently more hard to separate than that of Silver.

Volatile

Volatile Spirit of Sal Armoniack.

THIS Preparation is a volatile Salt raised from *Sal Armoniack* by the means of *Quick-lime*, and dissolved into a liquor.

Take eight ounces of *Sal Armoniack*, and four and twenty ounces of *Quick-lime*; powder them apart, and when you have mixed them in a mortar, pour upon them four ounces of water, and put it quickly into a Retort, whose half must remain empty. Set your Retort in a sand Furnace, and fitting to it a great Receiver, and luting the junctures exactly, begin the distillation without fire, for a quarter of an hour; afterwards increasing it by little and little unto the second degree, continue it until nothing more comes forth; take off your Receiver, and pour out the Spirit immediately into a Viol, turning away your head as much as may be to avoid a very subtil vapour that continually rises from it. Stop the bottle close with wax, to keep the Spirit in; you will have of it five ounces, and six drachms: *Quantity.* and the Operation will be perfected in three hours time.

It is an excellent Remedy for all diseases that *Vertue.* proceed from Obstructions, and corruption of Humours, such as Malignant Fevers, the Epilepsie, Palsie, Plague, Small-pox, &c. It drives by perspiration, or by Urine: The Dose is from six *Dose.* drops to twenty, in a glass of *Balm*, or *Carduus* water.

Remarks.

Remarks.

Quick-lime, which is an alkali, destroys the strength of the acid Sea-salt, which in a manner bound up the volatile salts in the *Sal Armoniack*, whence it comes to pass, that as soon as *Lime* and *Sal Armoniack* are mixed together, there exhales an unsufferable smell of Urine; for the volatile salts coming forth abundantly do so fill the Nose and Mouth of the Artist, that he would never be able to put the mixture into the Retort, if he did not take good care to turn away his head, while his hands are at work.

Water is added to it to liquify these volatile salts, for if there were nothing to moisten them, they would suddenly sublime to the neck of the Retort, and stopping it all together would break it to pieces.

You must stop the Retort with your hand, so soon as you have poured the water into it, and shaking it one minute, you must hasten all you can to fit to it the Receiver, and to lute well the junctures; for the *Quick-lime* does presently grow hot, so soon as its body is opened; and this heat, which is very considerable would spend the more volatile of the salts, if there were no care taken to preserve them.

The *Quick-lime* being wetted does swell, and take up a great deal of room; wherefore the Retort must be filled but half full, that there may remain room enough for the Spirits to rarefy in; you must also use a large Receiver, in which the vapours that rise in abundance may be able to circulate with ease.

This

This Spirit is nothing but a solution of volatile salts in water; if you would sublime, and separate it from the water, you must put the liquor into a matras with its head, and proceed as I shall shew when I describe the volatile salt of *Vipers*; but this salt being dry, flies away more easily than when it continues dissolved in water, so that it were better keep it as it is.

This is a stronger Spirit than that which is prepared with *Salt of Tartar*, because the little fiery bodies of the *Quick-lime*, which are mixed with it, have quickned the motion of the volatile salts; likewise these fiery particles are they that do hinder the coagulation of this Spirit with *spirit of Wine*, when they are mixed together, for there must be a cohesion and repose of parts, in order to make a *Coagulum*.

You must also have a care when you remove the Receiver, not to hold your head over it; for this volatile salt suffering a greater separation than before, enters the Nose immediately, and hinders Respiration; insomuch that several persons have been seen to fall in a swoon by that means alone. Now to avoid this accident, you had best have ready a wet cloth, to stop the Receiver with, so soon as it is unluted.

This Spirit is an excellent *Menstruum* to make precipitations with, it destroys acids exceeding well, as do all other volatile alkalis; it is used to precipitate Gold, after it is dissolved.

It is good in those diseases I named, because it opens the pores, and drives the humours by perspiration or by Urine, according to the disposition of bodies: moreover as it is an alkali, it destroys the acids which caused these diseases.

Again,

*Causes
sleep.*

Again, it sometimes causes sleep, because it dulls the keenness of acid salts, which entering into the little conduits of the Brain, do cause perpetual watchings.

It is better to give volatile Spirits in Sudorifick waters, than broth, because the broth being taken hot, the heat would evaporate the better part of the volatile Spirits, before a man could reach the Porringer to his mouth.

*Remainder
of the
matter.*

You will find in the Retort thirty ounces of a white matter, which you must throw away as useless; it is the fixt salt of *sal Armoniack* mixed with the *Quick-lime*.

*Another Preparation of the Volatile Spirit of
Sal Armoniack, together with its Flowers,
and Fixt Salt against Feavers.*

POWDER and mix together eight ounces of *Sal Armoniack*, and so much *Salt of Tartar*; put this mixture quickly into a glass body, and sprinkle it with five ounces of Rain-water, set a head upon it, and after fitting the Receiver, and luting the junctures close with a wet bladder, place your vessel in sand, with a gentle fire at first to warm the Retort by little and little, and distil the Spirit drop by drop; but when you perceive there will distill no more, take away the Receiver, and stop it close: then encrease the fire to the third degree, and continue it about two hours, there will sublime the *white Flowers of Sal Armoniack*, which will stick about the bottom of the head like meal.

The

The Spirit hath the same strength, and virtues *Virtue.*
as the former: you will have seven ounces of it, *Quantity.*
and a half.

Gather up the *Flowers* with a Feather, and use them as you would those I described before the Preparation: you'll have of them ten drachms, and a half.

There remains at the bottom of the Cucurbite nine ounces, and three drachms, of a white fixt mass. You must dissolve it in sufficient water, then filter the dissolution, and evaporate it, until it is dry, you'll have a very white Salt, that may be reckoned a good Remedy for intermittent Feavers: the dose is from eight grains to thirty in the small Centaury water, or some other convenient liquor.

Remarks.

The *Salt of Tartar* serves in this Operation, as the *Quick-lime* did in the other; but because it is a more powerful Alkali than *Quick-lime*, you must not use so great a quantity of it. The fixt Salt of *Nitre* might be substituted in its place, or any other Alkali that you will.

By this operation you may perceive, that eight ounces of *Sal Armoniack* contain at least four ounces and a half of volatile Salt.

When the fire begins to heat the matter, there do rise up into the head store of volatile Salts, in a fine delicate CrySTALLINE form, but the moist vapours coming upon them do dissolve them into Spirit.

The Volatile Spirit of *Sal Armoniack* is then a dissolution of Volatile salt in water, and if there be not phlegm sufficient to dissolve all the volatile salt,

salt, there will remain some part of it at bottom of the Receiver, and that may likewise be turn'd into Spirit, by only adding water enough to dissolve it. Thus the Spirit becomes as strong as it can be made, for the pores of the water being filled with as much salt as they can contain, it can receive no more. But if there happens to be more water than the proportion of Volatile Salt requires, then the Spirit proves weak, and must be given in a larger dose.

This Spirit is Sudorifick, but you may perceive more sensibly the effect of *Sal Armoniack* to cause Sweat, by dissolving six or eight grains of this salt, and the same quantity of *Salt of Tartar*, each separately in two small doses of some proper liquor, and giving them to a Patient one presently after the other; for the *Salt of Tartar* working upon the *Sal Armoniack* in the stomach, after the same manner as it does when they are mixt together in a Mortar, the Spirits do separate from the latter with the more force, and act more powerfully, than when they were mixed, before they were given; for the little violence that the Volatile Spirits do use in their separation from sea-salt, does leave them the more activity, and disposes them the better to pass through the pores. Again, it is probable, that in the former effort which these Spirits made in their separation from the fixt part, when *Sal Armoniack* was mixt with *salt of Tartar* in a mortar, the more subtile part might fly away first, and be lost; now it is this subtile portion that is most proper to rarefie the humours, and to drive them forth by Transpiration.

The flowers do proceed from some part of the *Sal Armoniack*, which the *Salt of Tartar* had not sufficiently opened.

The

The Febrifugous Salt is nothing but a mixture of *Salt of Tartar*, and the fixt and acid part of *Sal Armoniack*, it works by *Urine*, and but seldom by *Sweat*, by reason that being fixed it precipitates more easily than it rarefies; and it is by this means that it opens Obstructions, which are often the first cause of Fevers.

If you mix in a *Viol* equal quantities of *Volatile Spirit of Sal Armoniack*, and *Spirit of Wine*, and shake them a little together, they will cause a *Coagulum*.

This Coagulation proceeds from hence, that the *Spirit of Wine*, which is a rarefied Oil, does unite with the *Spirit of Sal Armoniack* which is a saline liquor; and it is but the same thing which happens from stirring Oil and some salt liquor in a mortar, in order to make an Unguent, called *Nutritum*.

By this incorporation together, the salt is involved in the ramous parts of the sulphur, and these same sulphureous parts are checkt, or as it were fixed by the Salt, so that neither of them have any more freedom of motion; and from this repose of these parts does result the *Coagulum*.

It may be likewise said, That the conjunction of the acid that is in *Spirit of Wine* with the volatile *Armoniack* alkali, does contribute much to this Coagulation.

The *Spirit of Sal Armoniack* prepared with *Quick-lime* does not at all coagulate with *Spirit of Wine*, by reason of fiery parts that it contains. The *Salt of Tartar* too may have fixed some fiery bodies in the *Spirit of Sal Armoniack*, but there are not enough of them in it to hinder its adunation with *Spirit of Wine*.

Volatile

Volatile Spirit of Sal Armoniack dulcified.

THIS Operation is a volatile *Armoniack Salt* mixed, and dissolved in *Spirit of Wine*.

Take *Sal Armoniack*, and *Salt of Tartar*, of each four ounces, powder them separately and mix them well in a glass, or marble mortar, put this mixture into a glass body, pour upon it ten ounces of rectified *Spirit of Wine*, stir it all together with a wooden Spatule, and fit to the body a head, and Receiver, lute well the junctures, place the vessel in a sand-furnace, and give it a very little fire, to warm the body. The volatile salt will rise, and stick to the head, and neck of the Receiver. Increase the fire a little, and continue it, until there distils nothing more, the operation is ended in four or five hours. Let the vessels cool, and unlute them. You will find a volatile salt stuck to the head, and a spirit in the Receiver. Put quickly both the one and the other into a Retort in sand, and after having fitted another Retort to it to serve for a Receiver, and having luted the junctures, distil the whole with a small fire. Cohobate it again three times, then keep what you have distilled in a bottle well stoppt, almost all the volatile salt will be dissolved in the Spirit of Wine, and that which remains undissolved will receive a perfect dissolution in the bottle.

Virtus.

It is a very good Medicin for the Lethargy, the Palsie, the Scurvy, malignant Fevers, and Hysterical Maladies; it may be given instead of Spirit of *Sal Armoniack* before described. And it is not so repugnant to the taste. It works by Sweaty
or

or by insensible Transpiration; The Dose is from *Dose.*
 twelve drops to thirty, in some proper liquor; it
 is likewise good, outwardly applied, for the
 Palsie, and for cold pains.

Remarks.

So soon as the *Sal Armoniack* is mixed with the
Salt of Tartar, Volatile salts do rise from them,
 which would very much incommode the Artift if
 he should hold his nose over it. You must lose no
 time in putting the mixture into the body, and
 then stopping it, for these first salts are the most
 subtile of all.

This separation happens by reason that the *Salt*
of Tartar, which is an Alkali, breaks the fixed
 acid Salt, which is in the *Sal Armoniack*, and
 forceth it to quit its volatile Salts, which effect
 we have explicated already.

The Salts must be separately powdered, by rea-
 son of the loss which would be made of the vola-
 tile Salts, in the mixing of the *Sal Armoniack*
 with the *Salt of Tartar*.

In the making this mixture, you must not use
 any mortar made of metal, because that in the
 conflict of the two Salts it would be corroded, and
 that which was corroded from it would be apt
 to spoil the operation.

The body must be filled but half way, when the
 whole is in. The volatile salt is lighter than the
 Spirit of Wine, for it rises first.

When the Spirit of Wine is well rectified; it
 will not dissolve any of the volatile Salt, at first,
 but on the contrary it hinders this Salt from dis-
 solving in a liquor, because the ramous parts of the

*Volatile
 Salt lighter
 than Spirit
 of Wine.*

D d

wine

wine do stop the entrance of the air ; but if there be any phlegm in the Spirit of Wine, it dissolves the Salt according to the proportion that there is of it.

*Dose of the
Volatile Sal
Armoni-
ack.*

Those who had rather use the volatile *Sal Armoniack* dry, than in liquor, may keep it dry in a bottle well stoppt, and use it for the same purposes as the Spirit ; The Dose of it must be a little less, it is very white and pure : this keeps better than that which is drawn with water, because an impression of *Spirit of Wine* which remains in it, does serve to retain the Salts in some measure.

*Why the Vo-
latile Salt
mixed with
the Spirit
of Wine
does not co-
agulate.*

You need not wonder, that there happens no *Coagulum*, when Spirit of Wine and this volatile Salt are stirred together in a bottle, as there does by the mixture of Spirit of Wine, and Spirit of *Sal Armoniack*, for this Salt having all its parts intirely united, cannot so well mix with the Sulphur of Spirit of Wine ; but if you add water enough to dissolve the Salt, then there will be a *Coagulum*, because the parts of the Salt will be disunited, and by the help of water will enter into the pores of Spirit of Wine. I have explicated this *Coagulum* in the Remarks of the Chapter preceding.

The volatile *Sal Armoniack* does dissolve well with waterish liquors, and Spirit of *Sal Armoniack* may be made of them together, by only mixing water enough to dissolve the Salt. But if you would mix, or dissolve it in Spirit of Wine, you will find a great deal of trouble in the doing it ; if you should only infuse it in Spirit of Wine, it would none of it dissolve ; on the contrary, that is a way to keep and preserve the Salt ; therefore you must distil it over several times, that the saline parts may rarefie, and unite with the Spirit of Wine.

That

That which remains undissolved in the Receiver, has been very much rarefied by repeated distillations; for which reason it also dissolves some days afterwards.

Spirit of Wine in this Operation hath so wrought upon the volatile Salts that they are no longer so disagreeable to the taste or the smell as they were before, and it is by that means that it sweetens them, for Sulphurs do temperate the acrimony of Salts, as I have said, speaking of the Principles.

How it is sweetened.

Acid Spirit of Sal Armoniack.

THIS Spirit is a fixed *Sal Armoniack*, dissolved into a liquor with a great fire.

Take what quantity you please of the fixt *Ferri-ferous Salt*, that I have spoken of; powder it, and mix it well with thrice as much Potters-earth powdered: put this mixture into a Retort whose third part remains empty, place it in a close Reverberatory Furnace, and fit to it a large capacious Receiver. Lute the junctures close, and proceed in the method I spoke of, to make the *Spirit of Salt*; you'll find in the Receiver an acid Spirit, which is a very good diuretick. It is esteem-
ed to be specifick for malignant Diseases: The dose
is to an agreeable acidity in Juleps and broths.

Virtue. Dose.

Remarks.

This acid Spirit proceeds from the fixt part of the *Sal Armoniack*, for the Alkali contributes not one drop of it.

D d 2

Although

Although the *Salt of Tartar* has weakned the strength of *Sea-salt*, which was mixed with the volatile salts in *Sal Armoniack*, as I have said, this same *Sea-salt* nevertheless will yield a very acid Spirit upon distillation, because the parts of *Sea-salt*, though they have suffered a strong conflict with the other, yet do contain a Spirit as well as they do otherwise intire; after the same manner as when *Sea-salt* is reduced into a very fine powder, it continues as full of Spirits, as when it was in larger pieces; for you must not imagine that *Sal Armoniack* does contain the acidity of *Sea-salt* separate from its earth, for if it could remain in it in such a state, it would quietly divide the parts of the *Alkali salt*, with which it is mixed, and would be destroyed it self, but this *Salt* remains in it in its substance intire.

An Aromatick Volatile Salt.

THIS Operation is a Volatile *Sal Armoniack*, impregnated with *Aromatick* Essences. Powder and mix together equal quantities of *Sal Armoniack* and of the *Salt of Tartar*; put the mixture into a glass or earthen Cucurbite, and pour upon it very good Spirit of Wine, until it be an inch or half an inch above the mixture: Stir all well with a wooden Spatule: fit to the Cucurbite a head and Receiver; lute well the conjunctions with a wet bladder, set your vessel in sand, and give it a small fire for three or four hours: Then there will first rise a Volatile Salt, which will stick to the head, and thereafter the Spirit of Wine will distil into the Receiver,

Receiver, drawing also with it a part of the Volatile Salt. When it has left distilling, let the vessels cool, and unlute them: separate the Volatile Salt and weigh it: Put it into a glass Cucurbite, and for every ounce of Salt pour a drachm and a half of *Aromatick* Essence, extracted from one or many Plants, Flowers or Fruits, as the Essence of Cinnamon, Mace, Cloves, Mint, Rosemary: Stir all together with a wooden Spatule, that the Salt and the Essence may incorporate well together: cover the Cucurbite with a proper head, and having fitted a Receiver to it, lute well the conjunctions with a wet bladder: set it in sand, and give it a small fire, which will make the Volatile Salt rise and fix to the head: Let the fire go out, and the vessels cool, and then separate your Salt, and keep it in a Vial well stoppt. It is an *Aromatick* Volatile Salt.

This is a great Sudorifick: It is a good *Cordial* *Verue*, and *Cephalick*. It is good against a Lethargy, the Palsie, Scurvy, malignant Fevers, Small Pox, and Plague, it brings the Months to Women, and removeth hysterical Vapours. The Dose is *Dose* from four Grains to fifteen in some liquor proper for the disease.

Remarks,

The two Salts must be beaten into Powder apart, and then mixed in the Cucurbite. While the mixture is preparing, the Orifice of the vessel must be carefully stoppt, both with Paper and the hand, that the Volatile Salts may not fly away when they are set at liberty upon the mixture, as I have shewed heretofore. The Spirit

D d 3 of

of Wine doth also help to loosen them: it must be very well Alkolised; for if there be much Phlegm in it, the volatile salt would melt into it, and so instead of a volatile salt which is required, there would be only the spirit of *Sal Armoniack*.

The volatile salt is lighter than the spirit of Wine, therefore it rises first. The spirit of Wine always carries off some part of the volatile Salt, and it will serve in the following operation.

This operation may be performed by one distillation, if you mix the Essences with the Salts, and the spirit of wine, and proceed in the manner described. But then the spirit of wine should carry off most of the Essences, and there would not remain much in the salt.

There may be made as many different Aromatick volatile Salts as there are different Essences. *Silvius D'Elboe* is the first who spoke of this Salt: he reduced it to a liquor like to that which I am a going to describe, under the name of an Aromatick volatile spirit.

The Oil of *Aromats* or *Spices* operates better when mixed with the volatile Salt, than when alone; for this Salt is a vehicle to it, and makes it penetrate with greater force.

An Aromatick Volatile Spirit.

THIS operation is a dissolution of the spirituous parts of *Aromats* by the spirit of *Sal Armoniack* and the spirit of Wine.

Take Cinnamon, Mace, Orange Pill, and the Pill of Lemon, of each half an ounce, of *Sal Armoniack* four ounces, mix them well together,

ther, and put them into a glass bottle, add to it four ounces of the salt of *Tartar*, shake and stirr all together in the bottle, and pour upon it four ounces of Orange flower water, and as much of the spirit of Wine, impregnated with *Sal Armoniack*, as it was drawn off by the former Operation: Or if this be wanting, take of the good common spirit of Wine, stop the bottle exactly, and leave it to digestion, without fire, a fortnight, frequently shaking the bottle, thereafter pour all into a glass Cucurbit, to which you must fit a head and receiver very quickly, and having set your vessel in sand, distill the liquor by a small fire, untill no more drop: you shall have a very piercing spirit, which must be kept in a bottle well stopd.

It hath the same vertues as the preceding *Dose*.
Aromatick volatile salt. The Dose is from six drops to twenty in some proper liquor.

Remarks.

The outer Pill of Orange and Lemon must be used, because they are the most odoriferous and spirituous part of these fruits. The Salt of *Tartar* must not be mixed at first, because it would dissipate the volatile salts, before the mixture could be put into the bottle. The digestion must be made without fire, because heat would make some of the volatile part to evaporate, let the bottle be never so well stopd. The mixture is frequently stirred to dissolve the Essential parts of the Ingredients the better.

The insensible fermentation, which happens upon the loosning of the volatile *Sal Armoniack*,

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when

when the Salt of *Tartar* is added, contributes much to this dissolution. The spirit of wine is put in also to dissolve the oils, because it is a Sulphureous Menstruum.

This liquor may be better kept than the volatile salt, because the volatile spirits are detained by the Phlegm of the Orange flower water.

It is observed, That these volatiles ought to be taken always in some cold liquor, and not in hot broth, lest the heat of it make the volatile evaporate before the Patient take it.

You may make use of other Aromates or Spices instead of those I have named, when you would make volatile spirits of different virtues.

CH A P. XVIII.

Of Vitriol.

*Composition
of Vitriol
and its
kinds.*

Vitriol is a Mineral compounded of an Acid Salt, and Sulphureous Earth; there are four sorts of it, the *Blue*, the *White*, the *Green*, and the *Red*.

*Vitriol of
Cyprus
and Hun-
gary.*

The *Blue* is found near the Mines of *Copper*, in *Hungary*, and the *Isle of Cyprus*, from whence it is brought to us in fair Crystals, which keep the name of the Country, and are called *Vitriol of Hungary*, or *Cyprus*; it partakes very much of the nature of *Copper*, which renders it a little Cau-
stick;

stick; it is never used but in outward applications, such as *Collyriums*, or waters for the eyes, and to consume proud flesh.

There are three sorts of *Green Vitriol*, the *German*, *English*, and the *Roman*. That of *Germany* draws near unto the *Blue*, and contains a little *Copper*, it is better than the rest for the preparation of *Aqua fortis*. That of *England* partakes of *Iron*, and is proper to make the *Spirit of Vitriol*. The *Roman* is much like the *English Vitriol*, excepting that it is not so easie to dissolve.

White Vitriol is a Salt drawn by the evaporation of the water of *Vitriolick Fountains*, or rather it is a *Green Vitriol* calcined into a *White* colour, and afterwards dissolved in water, which is filtrated and dried over the fire: However, certainly it is the most of all depurated from metallick mixtures. It may be taken inwardly to give use a Vomit, and it is also used in *Collyriums*.

Red Vitriol was brought among us a few years ago out of *Germany*, it is called *Natural Colcothar* or *Chalcitis*, and is esteemed to be a *Green Vitriol* Calcined by some subterranean heat. It is the least common of them all, it stops Blood, being applied to Hemorrhagies.

Vitriol in general is one of the most useful *Drugs* in Physick; for it enters into the composition of a great many excellent Remedies. It is called in Latin *Vitriolum*, and some of the ancient *Chymists*, who affected to give great and lofty names to their Remedies, have pretended that this name was mysterious, and that each of the Letters in it signified a word. Thus *Vitriolum* is, as it were, *Visitabis interiora terre, rectificando invenies optimum lapidem veram medicinam*.

Green Vi-
triol.
German,
English,
Roman.

White Vi-
triol.

Red Vi-
triol.

Vitriolum
a mystical
name.

nam. By which we are taught where this Mineral Salt is to be found, *viz.* in the Mines, which are the bowels of the earth; how it is to be drawn out by purifying of the metallick matter: And lastly, its vertue and use in that it contains a matter truly Medicinal.

Vitriol is commonly found near mines of Metal, and sometimes naturally Crystallized, but it is more frequently mixed with *Earths* and *Mar- cassites*, out of which it is to be extracted by the means of a *Lye*, as we do *Salt-peter*.

Vitriol is very often drawn out of a kind of stone, which is found where Potters get their clay, and sometimes that very clay or fat Earth contains a little *Vitriol*.

Ink. If you dissolve a little *white*, or *green Vitriol* in water, and write with the dissolution, the writing will not be seen; but if you rub the paper with a little Cotton dipt in the decoction of *Galls*, it will appear legible; then if you wet a little more Cotton in *Spirit of Vitriol*, and pass it gently over the paper, the Ink will disappear again; and yet at last if you rub the place with a little more Cotton dipt in *Oil of Tartar* made *per Deliquium*, it will again appear legible, but of a Yellowish colour.

The reason that I can give for these effects is this, the *Spirit of Vitriol* dissolves a certain *Coagulum* which is made of *Vitriol* and *Galls*, but the *Oil of Tartar* breaking the force of this acid Spirit, the *Coagulum* recovers it self, and appears again, but because it now contains *Oil of Tartar* too, it acquires a new colour.

If you throw the dissolution of *Vitriol*, or *Vitriol* only powdered, into a strong decoction of dried *Roses*,

Roses, it will turn as black as common Ink; if you pour some drops of *Spirit of Vitriol* into it, this Ink will turn red; and if you add to it a little volatile spirit of *Sal Armoniack*, it will turn gray.

These changes of colour do proceed from the *Spirit of Vitriol's* dissolving the *Coagulum* which the *Vitriol* it self had made, and rendring it invisible; the liquor recovers a fresher red colour than it had, before the *Vitriol* was put into it, because the same Spirit does separate the parts of the Rose which were dissolved in the liquor, and renders them more visible.

The volatile spirit of *Sal Armoniack*, which is an alkali, does partly break the acid edges of the *Spirit of Vitriol*, so that the parts of the Rose having nothing more to keep them rarefied, do close together, and consequently the liquor changes colour.

By this experiment may be seen, that the dried Rose may serve to make Ink with, as well as Galls; *Indian wood*, and divers other things will do the same.

Gilla Vitrioli, or, Vomitive Vitriol.

THIS Operation is only a purification of *White Vitriol*.

Dissolve what quantity you please of *white Vitriol*, in as much *Phlegm of Vitriol*, as is needful to dissolve it; filtrate the dissolution, and evaporate two thirds of the moisture in an earthen pan. Put the rest into a cool place for three days time, there will shoot out Crystals, which you must separate; then evaporate a third part of the liquor that

that remains, and set the Vessel again in a Cellar, there will shut new Crystals; continue thus evaporating and crystallizing, until you have gotten all you can; dry these Crystals in the Sun, and keep them for use: it is a very gentle Vomitive, the dose is from twelve grains to a drachm, in Broth, or some other liquor.

Virtue.

Dose.

Remarks.

This is only a Purification of *Vitriol* that serves to separate a little earth from it.

All the liquor may be evaporated without any Crystallization, the *Gilla Vitrioli* will remain at bottom in a white powder.

White Vitriol is used in this operation rather than *Green*, because it is milder.

The other *Vitriols* may be purified after the same manner.

After taking this vomit, a man sometimes voids by stool a black matter like Ink, because it frequently happens that some part of the *Vitriol* descending into the Guts, meets a saline matter that it joyns with, and so causes a blackness, as it uses to do when *Vitriol* is mixed with Galls.

Calcination of Vitriol.

Put what quantity you please of *Green Vitriol* into an earthen pot unglazed; set the pot over the fire, and the *Vitriol* will dissolve into water; boil it to the consumption of the moisture, or else until the matter turn into a greyish mass drawing towards white; this is called *Vitriol Calcined to whiteness*.

whiteness. If you should Calcine this grey *Vitriol* ^{Calcined} *Vitriol* of a good while over a strong fire, it would turn as red as blood. It is called *Colcothar*, and is good ^{Artificial} *Colcothar* to stop blood, being applied to a wound.

Remarks.

You must not Calcine the *Vitriol* in a glazed pot for fear of dissolving the Varnish, which would change the nature of the *Vitriol*.

It may be Calcined, or rather dryed in the Sun, untill it becomes white, this Calcination deserves to be preferr'd before the other, but only it is longer a doing.

The *Vitriol* may be likewise spread about a Furnace heated a little, and so dried untill it turns white.

If you should resolve to dry as exactly as you can, sixteen pounds of green *Vitriol*, there would remain but seven pounds of white *Vitriol*.

But in order to do this, you must powder the white mass of Calcined *Vitriol*, after you have broke the pot, and stir it a long time in an earthen pan, over a little fire, until there rises no more fume from it, or until there remains in it no more phlegm.

If you should Calcine this white *Vitriol* to a redness, you'd have five pounds and a half of *Colcothar*. The sulphur of *Vitriol* is lost during this last Calcination, you must do it in the Chimney, for the fumewould be very injurious to the breast. This sulphur has the same smell as ordinary sulphur.

Some have writ, that the red colour which appears after a long Calcination of *English Vitriol*, was an undoubted proof that there was *Copper*

in

in it, after the same manner as the red colour which happens to Verdigreese calcined is a certain proof that it contains in it some particles of Copper.

But that which is here said to pass for a thing undeniable, is no proof at all; for first of all those Vitriols which are thought most to partake of Copper, do give no greater redness in their Calcination, than the others which partake the least of it. Secondly let Copper be prepared which way you please, you can never make it redder than the Colcothar of English Vitriol, whose redness must be thought to proceed from some particles of this metal contained in it. And thirdly, we see plainly, that Iron, Lead, Mercury, and divers mineral bodies do acquire a red colour in their Calcining, without containing any Copper.

Sympathetical Powder.

The Sympathetical powder that has made so much noise is nothing but white or Green Vitriol opened, prepared divers ways according to many different conceptions about it. The Roman Vitriol is better esteemed than the other for this operation.

Its preparation.

The common method of preparing this Powder is to expose it to the heat of the Sun, whilst the Sun is in Leo, that is in July, in order to dry it, and to open it. And men think that Sign does bestow particular influences on the preparation. Though in truth it undergoes drying better in that season than another, by reason of the great heat then of the Sun. And it may be the parts of the Vitriol do become more volatile by this heat, but for what is said of Influence it is meerly imaginary.

Many do only pulverize the ordinary Vitriol, in order to make the Sympathetical powder.

When

When you would use this powder, you are to *use* take the blood of a wound upon a linnen cloth, and to sprinkle some of it upon the blood. It is pretended, that though the bloody linnen were ten miles off from the Patient, when the Sympathetical powder is applied to it, the wound would presently heal. But the experience of several persons who have tried it (and others may do the same) does evince, that men have had a great faith, when they have talked of the effects of this powder; for if it be not applied to a cloth newly blooded, and even in the chamber of the Patient, you will certainly find no effect from it. Nay where such precautions have been used, it performs no great matter, and sometimes does nothing at all.

Now to explicate the action of *Vitriol*, called *The Effects of Sympathetical powder explained.* Sympathy, you must know that there does continually exhale into the air, little bodies from this mineral salt; and to convince you of it, you need only to put the several *Vitriols* of different colours pretty near one another in the same place; you will find after 12 or 15 daies that they have all changed colour a little in their *superficies*. The white will become yellow, the green whitish, the blue greenish, the red grayish. These changes of colour cannot proceed but from little bodies, which being separated from each kind of *Vitriol*, and mixing in the air, some part of them do fall confusedly on the matter. And it must not be said that these changes are caused by the air, which does open and rarefie these salts; for if you put them into places separate, or distant from one another, this effect will in no wise happen.

You

You must also observe that the blood, to which the Vitriolick powder is applied, retaining some heat still, may thereby increase the activity and number of the little bodies which do arise from the *Vitriol*.

And these Vitriolick bodies dispersing themselves in the air are they that cause all the Sympathy, for they do mix in the wound of the patient, and because the virtue of *Vitriol* is to stop the blood, and to dry it, you need not wonder if the volatile parts which come from it, do perform the same effect.

Objection. But it may be objected, That the volatile parts of *Vitriol* have no more determination naturally to go find out the wound of a person, than other parts of the body, and other places of the chamber. Nay on the contrary, that a wound being commonly covered with a plaister, and somewhat thick bandage, is not so likely to receive those bodies.

Answer. I answer, That there is no need of giving any other determination to these volatile parts of *Vitriol*, than is given to other volatile Salts which are dispersed in the air; but because wounds are always of a glutinous temper, it is easie to conceive that these little bodies will adhere to them in greater quantity than to others, as any downy substance which flies about a room, wherein there is Glue, or Turpentine, will more easily stick in them, than in other places.

As for the Bandage and Plaster, used to wounds, you must know that those who do use the Sympathetical powder, do apply none of them. But when it happens, which is very rare, that a man's wound has been cured by this Powder, although there was a Plaster and bandage also laid upon it,

it, this effect can never be attributed to any thing else but the penetration of *Vitriol*, for there are wounds that a very little quantity of *Vitriol* is capable of drying.

Thus I have given you the most rational explanation that can be, of an effect which has hitherto passed for a thing altogether inexplicable.

To conclude, I would not advise any wounded person to insist or depend too much on a remedy of this nature; for to one who ever received considerable good, there's a hundred, who never perceived any effect from it, and the cause of it has been, that the volatile parts of the *Vitriol* have hapned to be diverted from the wound by some wind, or else because the greatest part of people have their blood too subtle, and too active to be fixed by so little a quantity of *Vitriol*.

Nevertheless those whose heads are filled with the Sympathetical Powder do speak of it, as of a never failing medicine. And if a man offers to convince them by an experiment to the contrary, as it is not hard to do, they presently cry out, that the reason it fails is, because it is ill prepared; but it is easie to convince them, if they desire a serious satisfaction in it, for the powder of their own preparation, that they so much magnifie, though it be successful in one, will be found to fail in a great many others.

Many Authors have also written a great many fallshoods in defence of the Sympathy, as for example, that if the Urine of an Infant were cast into the fire so soon as it is made, it would cause a heat of Urine: that if the excrements of an animal were thrown into the fire, or among Nettles, there would be an Inflammation in the guts of the

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same

same creature, and many the like stories, which a thousand experiments will prove not to be true.

Distillation of Vitriol.

THIS Spirit is an acid Salt of *Vitriol*, dissolved into a liquor, by a great fire.

Fill two thirds of a large earthen Retort, or glass one luted, with *Vitriol Calcined* to whiteness; place it in a close Reverberatory Furnace, and fitting to it a great Balon or Receiver, give a very small fire to warm the Retort, and make the water come forth that might still remain in the *Vitriol*; and when there will distil no more, pour the water out of the Receiver into a Bottle, this is called *Phlegm of Vitriol*; it is used in Inflammations of the eyes to wash them with: refit the Receiver to the neck of the Retort, and luting the junctures exactly, encrease the fire by degrees, and when you perceive Clouds to come forth into the Receiver, continue it in the same condition, until the Receiver grows cold; then strengthen the fire with wood to an extreme violence, until the flame rises through the Tunnel of the Reverberatory as big as ones arm. The Receiver will fill again with white Clouds; continue the fire after this manner for three days, and so many nights, then put it out: unlute the junctures when the vessels are cold, and pour the Spirit into a glass body, set it in sand, and fit to it quickly a Head with its Receiver; lute the junctures close with a wet Bladder; and distil with a very gentle fire, about four ounces of it, this is the *Sulphureous Spirit of Vitriol*, keep it in a viol well stoppt.

*Phlegm of
Vitriol and
its use.*

*Sulphureous
Spirit of
Vitriol.*

It

It is good for the *Asthma*, Palsie, and diseases *Vertue.*
of the Lungs, the Dose is from four drops to ten *Dose.*
in some convenient liquor.

Change the Receiver, and augmenting the fire, *Acid Spirit*
distil about half the liquor that remains in the bo- *of Vitriol.*
dy: this is called the acid *Spirit of Vitriol*, it is
mixed in Juleps to an agreeable acidity.

That which remains in the body is the most *Oil of Vi-*
acid part of the *Vitriol*, and is improperly called *tritol.*
Oil. It may be used like the acid Spirit, for
continued Fevers, and other distempers that are
accompanied with a violent heat. This Oil is
likewise used for the dissolution of metals.

You'll find in the Retort a *Colcothar* which *Colcothar.*
hath the same virtues with that I spoke of before.

Remarks.

To make the *Spirit of Vitriol* you must take *How to di-*
green English Vitriol, such as being rubbed upon *stinguish*
Iron doth not at all change colour, which shews it *English*
doth not partake of Copper, as the *German* does, *from Ger-*
that looks a little bluish, and is more acrimoni- *man Vitriol*
ous. You must calcine it as I have said, to the
end it being deprived of the greatest part of its
phlegm, the distillation may be dispatched the
sooner. A third part of the Retort is left empty,
that the Spirits may have room to rarifie in,
when they come forth.

There is a *Phlegm* drawn from this Mineral *Dew of*
Salt by distillation in the *Balneum Mariæ*, which *Vitriol.*
Chymists call the *Dew of Vitriol*.

There distils also a great deal of *phlegm* into
the Receiver, and all of it is known to have come,
when there drops no more. Those who don't

care for the *Sulphureous Spirit*, do let it come forth, and mix together with the *Phlegm*, before the junctures are luted; but you must be sure to govern the fire discreetly at that time; for these Spirits come with a great deal of violence, and use to break the Retort, when they are driven too furiously. When they are out, you must augment the fire to the last degree of all, for the acid Spirit will not part with its earth, until it is forced by an extraordinary heat.

Quantity. If you distil eight pounds of *White Vitriol*, at sixteen ounces to the pound, you'll draw off twelve ounces of *Phlegm*, four ounces of the *Sulphureous*, and twenty four of the *Acid Spirit* and oil of *Vitriol*.

You'll find in the Retort five pounds eight ounces of *Colcothar*, from which you may draw four pounds and a half of Salt, as I shall shew hereafter.

Use all the care you can possible to preserve all the liquors which come from *Vitriol*, yet it will be impossible for you to hinder it from losing some through the junctures, during the distillation.

If you should use *German* instead of *English Vitriol*, you'd draw off a little more Spirit than the quantity I have named, but it would have some smell of *Aqua fortis*, and the matter which remains in the Retort would be of a brown colour drawing towards black. This colour proceeds from sulphureous Fuliginolities which rise more from this *Vitriol* than the other, because it partakes of Copper; for this Sooty vapour finding no vent to get out at, falls down again upon the matter and blackens it.

The

The Furnace in which this operation is performed must be very thick, that the heat of the fire being none of it lost through the Pores, may the better act upon the Retort. These Spirits do rarefie into white vapours in the Receiver, which must be provided large enough, to give them free liberty to circulate in, before they condense into a liquor at bottom. The fire is usually continued four or five days together, but if after that, you should change the Receiver, and continue the fire three or four days longer, there would come forth an *Oil of Vitriol* congealed, and caustick, which is nothing but the more fixt part of the *Spirit of Vitriol*. And this Congelation hath given this liquor the name of *Oil of Vitriol*, though improperly.

*Congealed
Oil of Vi-
triol.*

Vitriol contains earth enough, wherefore none is added to it, as is necessarily done in the distillation of *Nitre*.

Acid Spirits are Salts become fluid by the force of fire, which hath disingaged them from their more terrestrious part, and they may be revived again by pouring them upon some Alkali; for example, the *Spirit of Vitriol* remaining some time upon *Iron*, doth reincorporate into *Vitriol*, and the *Spirit of Nitre*, poured upon *Salt of Tartar* makes a *Salt-peter*.

There is one thing happens about the *Oil of Vitriol*, when it is very strong, which is strange indeed; it is, That if you mix it with its acid *Spirit*, or with water, or else with an *Ethereal Oil*, such as the *Oil of Turpentine*, this mixture grows hot to that degree, that sometimes it breaks the *Viol* it was put into, and often it produces a considerable Ebullition.

*An Ebullition by the
mixture of
the Oil of
Vitriol with
other li-
quors.*

I could quickly give an account of this heat and Ebullition, if I would suppose an Alkali to be in the *Oil of Vitriol*, as those do who pretend to explicate every thing that happens by the notions of acid and Alkali; but not comprehending how an Alkali should be able to remain so long a time with so strong an acid as is the *Oil of Vitriol* without being destroyed, I had rather give a reason that seems to me abundantly more probable.

I conceive therefore that if water, or *Spirit of Vitriol*, or the *Ethereal Oil of Turpentine* do come to heat the *Oil of Vitriol*, it is by setting in motion a great many fiery particles which the *Oil of Vitriol* had drawn with it in the distillation; for these little fiery bodies being environ'd with Salts that are exceeding heavy, and hard to rarise, they drive about with vehemence whatsoever stands in their way, and when they have caused an Ebullition, and find they can't get out at the top of the Viol, they break it to pieces with the bustle they make at bottom, and on the sides.

Perhaps it will be said, I do here suppose gratis that the *Oil of Vitriol* does contain fiery particles; but if we consider the great violence of fire, and the time that is spent in drawing this acid, it will be no such hard matter to grant me this supposition. Besides, It will be hard to explicate the great and burning Corrosion of *Oil of Vitriol* without admitting these fiery parts, for the *Vitriol* contains nothing in it self of this Caustick nature; it is true indeed that it contains *Pblegm*, *Sulphur*, and *Earth*, but it is a thing impossible but this acid should discover it self more than it does, if it were as Corrosive in the *Vitriol*, as it is in the *Oil*.

Once

Once it happened to me, that putting into my Furnacea Retort, whose two thirds were filled with *German Vitriol* dryed, in order to draw off its Spirits, I distilled first of all the *Phlegm*, and sulphureous spirit, which I took out of the Receiver; I then fitted it again to the Retort, and by a great fire continued three days and three nights, I distilled off the acid Spirit as we are used to do. When the vessels were cold, I admired to find in my Receiver nothing but a mass of Salt, or Congealed *Oil of Vitriol*. This Salt was so exceeding Caustick and burning, that if I offer'd to touch the smallest part of it with my finger, I presently felt an insufferable scalding, and was fain to put my hand immediately into water: it continued to fume still, and when a little of it was thrown into water, it made the same hissing noise as a fire coal flung into water would do. Besides it heated the water very much, and much more than common *Oil of Vitriol* could.

I kept this congealed Spirit about six months, after which time it dissolved into a liquor, which I used as *Oil of Vitriol*; for it was in effect the same thing.

And in my opinion this operation does sufficiently evince, that *Oil of Vitriol* contains fiery parts.

It hapn'd to me another time, that having rectified the Spirit of *Vitriol*, to separate it from its Oil by an Alembick, some part of the distilled Spirit was turned into fair and transparent Crystals in the bolt-head, or Receiver, which Crystals had the same acrimony, and strength with the mass I now spoke of.

If you pour some drops of Spirit, or *Oil of Vitriol*, into a quart of hot water, in which you shall

Clear Crystals of the Oil of Vitriol.

How the Spirit of Vitriol infuse renders wa-

ter red with
a drop of
the Tincture
of Roses.

infuse a pugil of dried red Roses, the liquor will in a little time become as red as Claret; and this effect must not so much be attributed to the Spirit of Vitriol's sharpening the water, and so thereby drawing out the Tincture of Roses, as to this that the acid Spirit does rarefie and separate the particles of the Rose (which the water had dissolved) and made to appear better than before; for if you strain the Infusion, and separate the Roses, before you pour to it your Spirit of Vitriol, although the liquor so strained be yet but little raised in colour, it will nevertheless turn to as high a red, after the spirit is dropt into it, as if the Roses remained still in the liquor. We must say the same thing of other Tinctures that are drawn by acids, as also of such as are made by an Alkali salt.

Change of
Colours.

If you fill a glass Viol with the decoction of Nephritick wood clarified, and look on it, turning toward the light, it will appear yellow; but if you turn your back to the light, it will appear blue; if you mix with it some drops of Spirit of Vitriol, it will appear yellow on every side; but if you again add about as much more Oil of Tartar, it will return into its first colour.

If you take a Blue or Violet tincture made in water, such as is drawn out of the Sun-flower, or Violet flowers, and pour upon it some drops of Spirit of Vitriol, it will presently turn red; but if you throw into it some Alkali salt, it will recover again its former colour.

On the contrary if you pour an Alkali liquor, such as volatile Spirit of Sal Armoniack, or the Oil of Tartar, upon the blue Tincture, it will presently turn green; and if you again pour upon it a little Spirit of Vitriol, it will change this colour into an obscure red.

The

The decoction of *Indian wood* is very red: if you drop into it a little *Spirit of Vitriol* it will turn yellow; and if you add still some volatile *Spirit of Sal Armoniack* it will become black.

If you infuse three or four hours a piece of *Indian wood* in some clear juice of Citron, and take out your wood, the liquor will have received no alteration of colour: but if you add to it some drops of *Oil of Tartar* made *per deliquium*, it will take a brown colour, and if you add to it a little *Spirit of Vitriol*, it will resume its colour again.

If you pour some drops of *Oil of Tartar* upon Claret, it will become greenish; and if you add to it a little *Spirit of Vitriol*, it will return to its former colour.

All these changes of colour, which the *Spirit of Vitriol*, or other acids, and *Alkali's* do make, proceed only from the different positions of bodies dissolved in the liquor, and from its disposition to modify the light different ways.

Styptick Water.

THIS water is a solution of *Vitriol* and other ingredients, to stop bleedings.

Take *Colcothar*, or the red *Vitriol* that remains in the Retort after the spirit is drawn out, *Burnt-alom*, and *Sugar-candy*, of each half a drachm, the Urine of a young person, and *Rose-water*, of each half an ounce, *Plantain-water* two ounces, stir them all together a good while in a mortar, then pour the mixture into a Viol, and when you use it, separate it by Inclination.

If

If you apply a Bolster dipt in this water to an opened Artery, and hold your hand a while upon it, it stops the blood. In like manner you may wet a little Pledget in it, and thrust it into the Nose, when an Hemorrhage continues too long; taken inwardly, it cures spitting of blood, bloody flux, and the immoderate flux of the Hemorrhoids or Terms, the Dose is from half a drachm to two drachms in Knot-grass water.

Virtue.

Dose.

Remarks.

When the blood gushes forth too fast, you must redouble the first Bolster, that was put upon the wound, and assist it a little with your fingers for half an hour.

The Basis of this water is *Colcothar*.

Having used this water with good success upon several occasions, I was willing to insert it in this Book, and I believe if any body please to experiment it, as I have done, they will easily acknowledge it to be an excellent Remedy in many Distempers.

Lapis Medicamentosus.

Powder & mix together *Colcothar*, or the red Vitriol, that remains in the Retort after distillation, or in want of it Vitriol Calcined to a redness two ounces, *Litharge*, *Alom*, and *Bole-Arménick*, of each four ounces; put this mixture into a glazed pot, and pour upon it good Vinegar enough to cover the matter two fingers high; cover the pot, and leave it two days in digestion, then

then add to it eight ounces of *Nitre*, two ounces of *Sal Armoniack*; set the pot over the fire, and evaporate all the moisture. Calcine the mass that remains, about an hour in a strong fire, and keep it for use. You shall have eighteen ounces and two drachms of it. It is a good Remedy to stop *Gonorrheas*, a drachm of it is dissolved in eight ounces of Plantain water, or Smith's water, to make an Injection into the Yard; it is likewise good to cleanse the eyes in the small pox, seven or eight grains of it must be dissolved in four ounces of Plantain or eye-bright water for a *Collyrium*. It is also good to stop blood, applied outwardly to a wound. It may be dissolved in Knot-grass water, and will go near to have the same effects as the *styptick water*.

Virtue.

Dose.

Remarks.

This stone is called *Medicamentosus* by way of excellence, by reason of the good effects it produces.

The *Colcothar*, that remains in the Retort after the distillation of *Vitriol*, must be better than the others for this Operation; because being deprived of the greatest part of its Spirits, it is the more Astringent.

Litharge, which is a *Lead Calcined*, *Alom*, and *Bole-Armenick*, are so many considerable Astringents, that do no hurt in this composition.

Vinegar is put in to incorporate the ingredients together, and set them a Fermenting, after which the *Nitre* and *Sal Armoniack* do easily mix among the rest.

The

The Calcination which is given to it at the end, is done to carry off some part of the acid, and to augment the Astringion: It likewise fixes the stone the more, and makes it fitter to keep.

It is one of the best Remedies I ever met with, for stopping *Gonorrhœas*, when it is a proper time to stop them by Injections.

I prefer this Stone on many occasions to that of *Crolius*, which is prepared as follows.

Crolius his
Lapis Me-
dicamento-
fis.

Pulverize and mix together Nine Ounces of Alom, green and white Vitriol of each six ounces, an ounce and a half of *Anatron*, or in want of it, take common Salt, the Salt of *Tartar*, Wormwood, Mugwort, Chicory, Perchwort or *Arse-smart*, and Plantain, of each two drachms, put the mixture into a large earthen Pot glased, pour into it a little Rose-vinegar: stir all well together, and set the pot upon a gentle fire; the matter will dissolve and swell as it boils: stir it often with a Spatule; and when it begins to be thick, add to it three ounces of powder of *Cerufs*, also two ounces of the Powder of Bole *Armoniack*. Mix them exactly, and evaporate the humidity until the mass receives the consistency of a stone, which must be kept close, for it moistens with the Air.

There may be added to this Composition, towards the end, some Gums, as half an ounce of Myrrh, and as much of the powder of Incense: but then there must be a very small fire under the Pot, lest the Gums be burnt, which will make them lose their Vertue, which consists chiefly in their volatile parts.

Vertue.

This stone is good for Wounds; it cleanseth and drieth; it is used for the Itch, Scurfs and Tettars,

Ifettars, Wounds and Ulcers: an ounce of it is dissolved in a pint of Rain or River Water: and they dip the Linen into it which is applyed to the Sore. It is also used in desiccative Injections like the former.

Green and white Vitriol have the same Vertue, and they produce the same effect in this Preparation; wherefore you may either put both into it, or only one of them.

The true *Anatron* or *Natron* is a Salt extracted from the water of *Nile* in *Egypt*, which is at present very scarce in *France*. A *Succedaneum* to this is the Salt of glass, or the scum which is separated from the matter before it be vitrified.

The Salts of Wormwood, Mugwort, Chicory, Perch-wort, and Plaintain are fixed Alkalies, like that of *Carduus Benedictus*.

The *Lapis admirabilis* is also a kind of *Lapis Medicamentosus*, which is so called because of its great virtues; it is compounded after the following manner.

Powder and mix together of *white Vitriol* eighteen ounces, fine Sugar, *Salt-peter*, nine ounces of each, two ounces of *Alom*, six drachms of *Sal Armoniack*, and half an ounce of *Camphire*: Put the mixture into an earthen pot glazed, and give it the consistency of honey with Olive brine: then setting the pot on a small fire, dry the matter gently, until it receives the hardness of a stone: Keep it well covered from the air, because it soon moistens.

It is Deterlive, Vulnerary, and Astringent; it stops a Gangreen, it stays Blood, whether it be applyed dry or dissolved; it is used for Cataracts of

of the Eyes in *Collyriums*; for Scorbutick Ulcers; for old Gonorrhœas, either by injection or outward application.

You must observe, in performing this Operation, to temper the fire well, because of the volatility of Camphire. But what care soever be taken, a great part of it will evaporate, and therefore to remedy this defect, some Grains may be afterwards added to the stone, according to the use it is employed.

There are many other descriptions of this *Lapis admirabilis*, but what is here given is best.

The Philosopher's stone.

There is another kind of *Lapis Medicamentus*, which has got the name of the Philosopher's stone, and which is made after the following manner.

Powder and mix together twelve ounces of Roche-alom and *Roman Vitriol*, two ounces of Ceruss and white bole Armoniack, an ounce of the Salt of *Tartar*, and two drachms of Camphire and *Male Incense*. Put the mixture into an earthen Vessel, pour upon it, while you stir it with a Spatule, six ounces of Vinegar: Set the Pot upon a gentle fire, let the matter harden into a stone.

Virtue.

It is both Deterfive and Desiccative, and proper to heal Ulcers: an ounce of the Powder of it is infused into twelve ounces of white Wine and Plantain Water: and when the infusion is filtrated, they dip into it the bolsters or pledgets which are laid upon the sore.

There is reason to suspect, That in this Operation, as well as the former, the Camphire evaporates whilst the Pot is on the fire, how moderate soever the heat be.

If

If there be no *Roman Vitriol*, take *English Vitriol*, which has the same Vertue.

The white Bole is a kind of Marle.

White Bole.

The *Male Incense*, is called in Latin *Olibanum* *quasi oleum Libani*, from Mount *Libanus*, whence it is brought. It is a Gummi Resin, in white yellowish drops, which run by the Incision of several small Trees that are very common in the Holy Land, and in *Arabia Felix*, especially at the foot of Mount *Libanus*. That is the best which is clear and fair, which breaketh easily; and sendeth forth an agreeable Scent, when it is thrown into the fire, but bitter and unpleasant to the Taste, and whitning the Spittle.

Male Incense or Olibanum.

It is Deterfive, somewhat Astringent, and Corroborative; it is used both outwardly and inwardly. It is Sudorifick, and proper for Diseases of the Breast and of the Brain; for a Pleurisie, and for a Flux. The Dose is from one scruple to a drachm.

Virtus.

Dose.

Salt of Vitriol.

THIS Operation is the more fixed *Salt of Vitriol*, that remains after distillation.

Take two or three pounds of the *Colcothar*, that remains in the Retort after distillation of *Vitriol*, let it infuse in eight or ten pints of warm water for ten or twelve hours; boil it a little while, and then let it settle; separate the water by Inclination, and pour new water upon the matter; proceed as before, and mixing your Impregnations, evaporate all the moisture in a sand-heat in a glass or earthen Vessel, there will remain a salt at bottom.

It

Vertue.

It is used as the *Gilla Vitrioli*, to give a Vomit;
the Dose is from ten to thirty grains.

Dose.

Remarks.

This Salt is that part of the *Vitriol* that the fire is not able to rarefie into Spirit. Some Authors say, That it vomits just after the same manner, as *Gilla Vitrioli*, taken in a smaller dose, but I have observed that its effect was much less, and on the contrary there was need of giving it in a larger dose than the *Gilla*, to procure a Vomit; for having given of it several times a drachm at a dose, the person had no Inclination at all to Vomit; and truly I am apt to believe that a fixt Salt of *Vitriol* divested of its Sulphur, doth rather tend to precipitate downwards than mount upwards; for Vomiting is caused by Saline Sulphurs, which prick the Fibres of the Stomach, whence follows a Convulsion to this part.

That which remains indissoluble is called *Caput Mortuum*, it is used for Astringents.

If you expose it to the Air for a year, or a year and half, it returns into a *Vitriol* again.

CHAP.

CHAP. XIX.

Of Roche-Alom, and of its Purification.

Roche-Alom is a very Styptick Mineral Salt, ^{Roche-Alom.} found in the veins of the Earth in many places of *Europe*; it is taken up in great transparent pieces, the best is that which is reddish, for the white contains fewer Spirits.

Alom is purified after the same manner as Vitriol; it is used to cleanse the Teeth; it is a good ^{Virtue.} Diuretick; a drachm of it is dissolved in a quart of water, and a glass of it is given now and then.

Many things are likewise called by the name of ^{Alumen} Alom, as the ^{Saccharinum.} Saccharinum, which resembles Sugar, it is nothing but a mixture of Roche-alom, ^{Rose-} Rose-water, and the white of an Egg. ^{Plume-} Plume-Alom, ^{Plume-} Plume-Alom, which some call *Lapis Amianthus*, is a kind of Alom, Talk.

Distillation of Alom.

PUT five pounds of Roche-alom into a glass or earthen body, and fitting to it a head with its Receiver, distil in sand as much as will rise, you will have a ^{Alom-} Phlegm of Alom that is used for distempers of the eyes, for Quinsies, and to cleanse ^{water.} wounds: unlute the Vessels, break the body, and powder the white mass that remains in it, put it into an earthen Retort half empty; place your Retort in a Reverberatory Furnace, and sitting to

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it

it a large Receiver, lute the junctures close, and light a very small fire the first three hours only to warm the Retort, afterwards increase it every hour to the utmost violence, and the Spirits will come forth and fill the Receiver with white Clouds; continue the fire in this condition three days together, then let the vessels cool: you'll find in the Receiver, eight ounces of an acid Spirit, which you may rectify by distilling it in a glass Alembick in sand, in order to make it the clearer. This acid is more disagreeable than that of Vitriol, it is used in Juleps for continued Fevers, and Tertian Agues; the Dose is from four to eight drops; it is likewise good to cure the *Aphthæ*, or little Chancres in the mouth.

*Spirit of
Alom.
Vertue.
Dose.*

Break the Retort, and you'll find in it a white mass very much rarefied, and light, it is called *Burnt Alom*, or *Calcined Alom*, it is used for to eat carnos excrecences, or proud flesh.

*Burnt
Alom.*

Remarks.

The Distillation of *Alom* must be performed like that of Vitriol, that is to say, without addition of earth, because these Salts do contain enough themselves.

The Body into which you put your *Alom* must be sure to be large enough, because it rarefies extremely.

The *Phlegm* is known to be all come forth, when there distils no more; for these Spirits being very weighty do require a greater heat than that of sand to raise them.

Some have written that *Alom* yields but very little acid, yet if they take the pains to keep a strong

strong fire under it for three days together, they'll find that this Spirit does not give place in strength, or quantity to that of Vitriol.

Nor are we at all obliged to distinguish, as they would have us, the *Acrimonious*, *Corrosive* salt of *Alom* from its acid, seeing that there is nothing either *Acrimonious* or *corrosive* in this Mineral Salt, which will not turn into an acid Spirit, when it is strongly urged by fire.

If a Drachm of *Alom* be dissolved in six ounces of this *Phlegm*, you make an excellent *Alom* water to cleanse Wounds and Ulcers with.

The mass that remains in the Cucurbite, or *Dephlegmated Alom*, is more *Escarotick* than that which hath lost its Spirits.

Chirurgeons are wont to calcine *Alom* in a Frying pan; but the Iron dulls the greatest part of its vertue, as absorbing its Spirits wherein consists the corrosion of *Alom*; the Retort must be filled but half full, because there happen Ebullitions, which do require room.

CHAP. XX.

Of Sulphur.

Sulphur is a kind of *Bitumen*, or inflammable Mineral, that is found in many places of *Europe*, especially in *Sicily*: There are two general kinds of it, one Grey, the other Yellow.

Ff 2

The

Sulphur
vivum.

The Greyish is called *Sulphur vivum*, because it is brought to us as it came out of the Earth without being formed into Rowls: It is a kind of clay, apt to crumble, soft, and ready to take Fire. It contains Oil, an acid Salt, and Earth.

Virtue.

Its nature is to penetrate, attenuate, resolve, and so is proper for the Itch, or Scurfs, or Scabs, and to kill Lice: It is used in Unguents and Plasters.

Yellow
Sulphur.

Yellow, or common *Sulphur* is the *Greyish* melted and purified from its grosser Earth, and cast into moulds, which form it into Rowls, as we see it: There is in it much Oil, and acid Vitriolick Salt, but little of Earth.

Commonly the greatest *Yellow* Rowls are made use of, but for some Operations; that which is in finall *Green* Rowls is to be preferred, because there is in it more acid Salt, both the one and the other are ready to break, and are of a shining quality.

Yellow Sulphur is often used in Chymistry and in Physick; it is incisive, aperitive, delicative, good for diseases of the Lungs and Breast: It prevents corruption, and heals the Itch.

Some think that *Sulphur* is a Vitriol sublimed in the earth, because these mixts are very often found near one another; that there is a great deal of *Sulphur* in the mass of Mineral Vitriol, and that the acid Spirits which are drawn from them both are wholly alike.

Flower

Flower of Sulphur.

THIS Preparation is an exaltation of *Sulphur*.

Put about half a pound of *Sulphur* grossly powdered into a glass body, place it in a small open fire, and cover it with a pot or another Cucurbite turned upside down, one that is unglased, so as that the neck of the one may enter into the neck of the other. Change the upper Cucurbite every half hour, fitting another in its place; add likewise new *Sulphur*; gather your *Flowers* which you find stuck in the Cucurbite, and continue to do thus, until you have got as much as you desire. Then put out the fire and let the vessels cool, there will remain at bottom only a little light insignificant earth.

The *Flower of Sulphur* is used in Diseases of the *Venues*, Lungs and Breast, the Dose is from ten to thirty *Dose* grains in Lozenges, or in Electuary. It is used also in Unguents for the Itch.

Remarks.

This Operation is intended only to rarefie the *Sulphur*, that being become more open, it may work the better.

Sulphur is proper against Infirmities of the Lungs, when they proceed from a Viscosity that sticks to them, because it deterges; but if it should be given to such as are too much dried with a Fever. It proves very ill in that it raises a greater motion of the humours: It cures Tettars,

F f 3

and

and the Itch, because opening the Pores it drives out the subtler part of the humor, but yet the grosser part remaining within, they do frequently return again.

You may use a glass head to fit upon the body.

If you mix one part of *Sal Polychrestum* with two pounds of *Sulphur*, and sublime them together, as those I have described, you'll have *white Flowers of Sulphur*, which are thought to be better for distempers of the Breast than those others, they are given in the same Dose. This whiteness proceeds from a very exact attenuation which *Sal Polychrestum* gives to the *Sulphur*; the *Sal Polychrestum* which remains at bottom of the Cucurbit, may be calcined, and if you afterwards purifie it by solution, Evaporation and Filtration, it will be as good as before.

Magistery of Sulphur.

THIS Operation is a *Sulphur* dissolved by an Alkali Salt, and precipitated by an acid.

Take four ounces of the *Flower of Sulphur*, and twelve ounces of the *Salt of Tartar*, or *Saltpeter fixed* by the coals: put them into a large glazed pot, and pour upon them six or seven pints of water. Cover the pot, and setting it on the fire, make the matter boil five or six hours, or until being become red, the *Sulphur* is all dissolved. Then Filtrate the dissolution and pour upon it by little and little distilled Vinegar, or some other acid, there will presently appear a Milk, let it settle, that a white powder may precipitate to the bottom of the vessel; pour off by

Inclina-

Lac Sulphuris.

Inclination that which is clear, and washing this powder five or six times with water, dry it in the shade, this is called the *Magistery* or *Milk of Sulphur*; it is thought good for all diseases of the Lungs, or Breast; the dose is from six to sixteen grains in some convenient liquor.

Venus.

Dose.

Remarks.

Water alone is not able to dissolve such a gross body as *Sulphur*; wherefore an Alkali salt is added to divide it into small imperceptible particles.

The acid liquor pierces the Alkali, and by separating its parts makes it let go its hold, so that the *Sulphur* gathers it self together, and falls down to the bottom in a white powder. This powder is washed to take away the impression of the *Salt of Tartar*, and the acid that might remain among it, after which it may be said to be a *Flower of Sulphur Alcoholised*.

The change of its yellow colour into a white comes from this, that being more rarefied it hath a smooother surface than it had before, to reflect the light in a direct line to our eyes.

You must take care not to let there be any Silver vessel where this Operation is performed, because the vapour which proceeds from *Sulphur* will make it black.

Fifteen grains of this powder will do as much as double the quantity of *Flower of Sulphur*, for diseases of the Breast, and it doth not heat so much.

This Operation may give us an *Idea* of what happens in Chylification, and in Sanguification;

F f 4

for

for after the same manner as the *Sulphur* does become white, when it has been reduced into a *Magistery*, or fine powder, so the aliments having been fermented, and their substance attenuated in our stomachs, the Chyle receives a white colour; and after the manner as the *Sulphur* when intirely dissolved does turn of a red colour, so the parts of Chyle having been altogether exalted, and dissolved by repeated circulations, does become red and turn into blood.

This blood turns into a *Pus*, and becomes white in Imposthumes, because the acid which is found in them having as it were fixed and gathered together its insensible parts, does make them recover again the colour of Chyle. Even as the acid liquor, poured upon the red dissolution of *Sulphur*, gives it the colour of Milk.

This opinion is also confirmed by the following experiment. If you boil in a glass, or earthen vessel, any quantity of Chyle or Milk, with two parts of the *Oil of Tartar per deliquium*, the white liquor will turn red, because the *Salt of Tartar* does rarefie and entirely dissolve the unctuous substance of the Milk, and so turns it into a kind of blood. Indeed that which is formed in the vessels of the body, is both much redder and thicker: but then it is to be considered, that the Vital Elaboration within the body is not so quick, and much more exact and perfect than what can be done in a vessel of glass or earth, during only the space of a quarter of an hour: for in this Artificial Operation, only the most soluble part of the Milk or Chyle is dissolved, and the rest continues at bottom in a kind of *Coagulum*, whereas in the vessels of the body there is a Circulation, frequently

frequently repeated, and an Exaltation of all the parts of Chyle into Blood.

When I consider Sanguification, which is an Operation of Natural Chymistry, I can neither agree with the Moderns, who will have it acted in the heart, nor yet with the Ancients, who ascribed it to the Liver: for seeing, in my judgement, the Chyle is only exalted by a great number of repeated Circulations, therefore I think, all the Veins and Arteries of the body do contribute to the turning it into blood as well as the Heart and Liver. The most that can be said in favour of the heart is, that by its continual motion and the assistance of the Air, which it receives from the Lungs, it doth break and attenuate very much the parts of the Chyle, and renders them capable of being further divided by Circulation. But yet it doth not presently turn into blood, as many think; for if that were, there would be no blood in the Veins, nor would it appear in the Skillets with the blood that is drawn, as we see very often.

As to the Liver, we do not deny, but that it gives a great Elaboration to the Chyle, and that it doth very much subtilize its parts, by the heat and Circulation which are there: But yet it is requisite, that the Chyle pass and repass through many other places of the body before it turn into blood.

I am very much inclined to believe, That the Chyle is converted into the principal substances of our body, as it is diversly prepared.

Milk is acknowledged to be a Chyle; for it hath the consistency, colour, taste, smell, and qualities of it.

The

The Gravy or Juicy substance of flesh and bones resembles Chyle very much; Fat and Marrow, as they have the colour of Chyle, so they are only its more Oily parts: it is therefore very probable that the Chyle being differently attenuated and modified by Circulation, is capable of entering into the different pores of the several parts, which are so disposed as to receive Corpuscles of different figures: for it is with the pores of the body as with filters, which, whilst they suffer some liquors to pass through, do hinder others. Thus for example, the Kidneys filtrate Urine, and separate it from the blood.

This being supposed, and it being granted, that in the several parts of the body, there is great diversity of pores or filters, it will not be hard to explicate how the Chyle distributes it self through all, and nourisheth all.

Anatomists perceiving how quickly Chyle or Milk runneth in great quantity, into the breasts of Nurses, have fancied that there were particular Lacteal Vessels, which conveyed it from the stomach or other places: but none being yet discovered, therefore it is concluded, there are none, but only that the Chyle and blood do instantly separate themselves in the breast to become Milk.

I do therefore say, that Milk is a Chyle, which has not circulated much, and consequently which has received but a light Elaboration, and so is capable of entering into the breasts, which are as sponges, having pores so figured, that they can receive Chyle, and resist blood.

But when the Chyle has circulated a long time with the blood, so that it is become more attenuated and more concocted, it then receives many other

other determinations; for then it enters into pores where Milk cannot enter. Thus, as it circulates, its parts are rendred more and more subtile, so that it can conform and proportion it self to all the different pores of the body, filling and insinuating into the fibres of both flesh and bones, where by its Coagulation, it is the cause of both nourishment and growth.

The liquor, which swims about the blood in the Skillets, is not always an excrementitious or corrupt humour, as the Vulgar think; for very often it is a half prepared Chyle, designed to cherish flesh; for if by way of curiosity you set it upon the fire, it will soon turn to a kind of Gelly, which resembles the substance of flesh. The liquor which surrounds the Child in the womb of the Mother is of the same nature, which makes it probable, that it serves partly for nourishment to the *fetus*. But to go on with our discourse,

That which remains of the Chyle, after the nourishment of the several parts, continuing to circulate with the blood, is at last so rarefied and exalted that it turns into blood.

Some, without doubt, will ask me what the blood serves for, seeing I ascribe the nourishment of the several parts to the Chyle. *Objection.*

I answer, that it not only contributes much by its heat and the subtilty of its parts, to elaborate and concoct the Chyle, but also that it serves as a Vehicle to make it penetrate into the places whither it is designed: for if the Chyle was not raised, by the Spirit of the blood, it would stop in the passage. *Answer*

Moreover, it is more than probable, that the Chyle, rather than the blood, is the cause of nourishment;

nourishment; for seeing it is less subtil, and less rarefied, it is more proper to be condensed, and to incorporate with the Fibres for making Flesh and Bones. Experience agrees perfectly with this opinion; for we see, that persons very Sanguin are commonly very Lean, because all their Chyle has been rarefied and exalted; so that what entred into the Pores of the Body being mixed with Blood, could not condense into Flesh: on the contrary, fat and fleshy persons do not abound much with blood, because the greatest parts of the Chyle being converted in them unto Flesh and Fat, there is not much remaining to be exalted into Blood.

Balsom of Sulphur.

THIS Operation is a solution of the oily parts of common *Sulphur* in Oil of Turpentine.

Put into a small matrafs an ounce and a half of *Flower of Sulphur*, and pour upon it eight ounces of *Oil of Turpentine*; place your matrafs in sand, and give it a digesting fire one hour; afterwards encrease it a little for two or three hours, and the Oil will take a red colour; let the vessel cool, then separate the clear *Balsom* from the *Sulphur* that could not dissolve. This *Balsom* is excellent for Ulcers of the Lungs and Breast; the Dose is from one drop to six in some proper liquor.

This *Balsom* may be reduced to the consistence of an Unguent, by evaporating some part of it, and it is thus used to cleanse Wounds and Ulcers.

To make the *Aniseed Balsom of Sulphur*, you must use the Oil drawn from *Aniseed* instead of the

Virtus.
Dose.

Aniseed
Balsom of
Sulphur.

the *Oil of Turpentine*, and proceed as I have said ; it is more agreeable than the former, and has less acrimony.

Remarks.

There is no need of a great fire for this Operation, because *Sulphur* being a fat body doth easily incorporate with Oils, and commonly gives them a red colour. When you would have this *Balsom* taken in Potion, you must dissolve it in a little yolk of an Egg, that it may mix in waters, or broths.

That which remains undissolved in the matras is the acid or saline part of *Sulphur*, and is found crystallized.

A *Balsom of Sulphur* may be likewise made with *Oil of Linseed*, instead of the *Oil of Turpentine*, for Wounds.

Spirit of Sulphur.

THIS Spirit is the acid part of *Sulphur*, turned into a liquor by fire.

Provide a great earthen pan, and set in the middle of it a little earthen pan turn'd upside down, and then another such pan on this filled with melted *Sulphur*; cover both these Pans with a great glass tunnel made on purpose, with a neck as long as that of a matras, and the bigness of a thumb; fire the *Sulphur*, and do not stop the hole of the Tunnel, but let the air come in to increase its burning, for it would otherwise go out. When your *Sulphur* is spent, put new in its place, and continue to do so until you find under the lower
pan

pan as much Spirit as you need, keep it in a Viol.

Virtue.

It is put into Juleps to give them an agreeable acidity, to qualifie the heat of continued Fevers, and is a good diuretick. Some do prescribe it for diseases of the Breast; but because acids are apt to give a Cough, it may therefore do more hurt than good to that part.

Remarks.

A great many *Machines* have been invented to draw the *Spirit of Sulphur*; the ordinary one is the *glass Bell*, under which the *Grimstone* is burnt, and the Spirits coagulating against its sides distil in an earthen pan, that is set underneath, after the same manner as I have shewed in the description of my *Machine*.

You must leave an empty space between the brims of the Bell, and the Pan, that the Fire may have air enough to keep it lighted; but besides that the Fire is apt to go out every moment, use never so much precaution, a very poor quantity of Spirit is drawn this way.

Authors do recommend this Operation to be done when the weather's wet, and to moisten the Bell before-hand; but I have found by experience that these circumstances signified nothing at all.

With the *Machine* that I have described I can draw a good handsom quantity of Spirit, and I am not forced to fire the *Sulphur* several times; because the hole at top gives vent to the air, and hinders the fires going out: Again the more Phlegmatick part evaporates that way, but the acid Spirit not being able to rise so high, condenses against the sides of the tunnel, and then falls

falls down under the little pan that is turned upside down, to raise the other higher, that contains the *Sulphur*. You may use a Crucible instead of a pan to put the *Sulphur* in.

The greenish *Sulphur* is better than the other for this Operation, because it has more Vitriol in it, and consequently more Spirit; for this Spirit is nothing but a *Vitriolick Salt* dissolved, that differs little from the *Spirit of Vitriol*, besides in the Taste, which is not so Empyreumatical, as not having undergone so violent a fire.

The *Vitriolick Salt* which is in the *Sulphur* does not rise, until the more volatile parts are spent; for which reason the Spirit does not distil until towards the end, and the drops begin then to appear in the middle of the Tunnel.

Forasmuch as *Sulphur* is good for diseases of the Lungs and Breast, many do think that the Spirit which is drawn from it ought to have the same virtues, but they do not consider that this Spirit being deprived of the fat, or more sulphureous part of *Sulphur*, hath also lost the virtue that accompanies it, and that it must produce effects altogether different from those of *Sulphur*, after the manner as the acid Spirits which are drawn from Sugar, Vitriol, and many other matters, have very different virtues from those of the mixts themselves. And the reason of it is very plain, for whereas the *Sulphur* by its ramous parts can sweeten the acrimonious humours which fall upon the Lungs, and so help the Cough, the *Spirit of Sulphur* which is an acid does prick the Fibres of the *Larynx*, and cause a Coughing, as all other acids do: And the Cough does such violence to the Breast and Lungs, that they cannot be sensible of any good effect of this remedy when used. I

I am therefore of opinion, that, in Diseases of the Breast and Lungs, we ought to abstain, as much as can be, from such food and remedies as raise a Cough, which, for the most part, may be called, on such occasions, the Alarum and Trumpet of Death.

*Another Preparation of the
Spirit of Sulphur.*

THIS Operation is the acid of *Sulphur*, separated by the means of fire and *Salt-peter*. Take a great earthen pot, round and large, which may contain about two pales of Water, with a Cover of Earth likewise: pour into it two or three pints of Fountain-water, and put into the midst of the water a long earthen pot, the head downwards, let the half or the third of the height of it be above the water.

Make a mixture of four pounds of the powder of *Sulphur*, and four ounces of *Salt-peter*, with which, fill a small earthen pot, and set it upon the reversed pot: Put a red-hot horse-shoe to the *Sulphur*, which will raise it into a flame: cover your pot instantly, that the vapour not finding any passage may fall down and condense in the water; when you feel with your hand that the Cover is cool, it is a sign that the Iron does not touch the *Sulphur*; therefore uncover the pot, and fill it again with the same mixture, and lay upon it another horse-shoe which you have made red-hot for the purpose: cover your pot again, and continue to do thus until you have used all your matter. When the vessels are cooled, you

you must take away both the small pot and the reversed one, then filtrate the liquor, and evaporate the humidity, until you have a brown and very acid liquor, which must be kept in a bottle. This is the Spirit of *Sulphur*.

It hath the same vertues as the former, and the Dose is the same, but I prefer the other to it.

Remarks.

The pot for making of this Spirit must be very large, that the vapours may have room to circulate before they condense: the pot must be of Earth, that the acid may not penetrate it: and for the same reason, the other long pot, which is reversed, must be either of Earth or Glass. The water serves only for condensing the vapours, which would partly dissipate if it were not for this.

Sulphur containing a very fixt acid would be extinguished as soon as the pot is stopped, if *Salt-peter* were not mixed with it: for this Salt, by its volatile parts, does rarefie and exalt the *Sulphur*, which is heated by the red-hot Iron, and it forwards the separation of the Spirit: but if it produces this good effect, we may also say, that it changeth, in some measure, the vertue of the Spirit of *Sulphur*; for the acids of these two matters mix together, and render this Spirit less pure than that which is made of *Sulphur* alone. Indeed the acid of *Nitre* may be taken inwardly, and there have been seen good effects of it: but we are not treating now of the Spirit of *Nitre*, we are shewing how to make the Spirit

G g of

of *Sulphur*, which ought to be prepared as pure as possible; and for this cause, I prefer the Spirit of *Sulphur*, according to the former Operation, to this we are now speaking of.

Some put two ounces of *Salt-peter* to every pound of *Sulphur*, that they may have more of the Spirit: but the more *Salt-peter* is added, the less pure is the Spirit of *Sulphur*.

The Cover of the pot must be close, that the vapours may not dissipate. Half of the little pot may be filled with sand, and the mixture put above it, instead of filling it wholly with the mixture, as I have described; for only half of the matter burns, because the Iron cannot touch the other half, seeing it lyeth upon the brim of the pot.

Horse-shoes are more proper than *Iron* of any other figure, because they can lie conveniently upon the head of the pot: They are heated one after the other, that when one is taken out, the other may be presently put in its place. The liquor is filtrated, because there always falleth down some impurity: almost all the water in the pot is evaporaced, and there is a much larger quantity of the Spirit of *Sulphur* got by this Operation than by the former: However, it hath the same colour, the same taste, and the same weight as the other. These Spirits are often called the Oil of *Sulphur*, as we call the Caustick Spirit of *Vitriol*, the Oil of *Vitriol*.

Oil of Sulphur.

Salt

Salt of Sulphur.

THE *Salt of Sulphur* is a *Sal Polychrestum* impregnated with *Spirit of Sulphur*.

Put four ounces of *Sal Polychrestum* prepared as I have said, into an earthen pan, or a glass Vessel, and pour upon it two ounces of *Spirit of Sulphur*; set your Vessel in sand, and evaporate all the liquor over a gentle fire: there will remain four ounces and six drachms of an acid salt, most agreeable to the taste, keep it in a bottle well stop'd.

It is a good medicine for to open all Obstructions, and to work by Urine, and sometimes it works also by stool; the Dose is from ten grains to two scruples in broth. It is dissolved from half a drachm to two drachms in a quart of water for a drink in Fevers.

Remarks.

This *Salt* is improperly called *Salt of Sulphur*; for it is nothing but a *Sal Polychrestum* impregnated with an acid Spirit.

Many great descriptions have been given of *Salt of Sulphur*, which being well examined do all come to the same thing as this; it is called by many Authors a *Febrifugous Salt*.

The true *Salt of Sulphur* (truly so called) should be a little of the fixed Vitriol which remains in the earth of *Sulphur*, after that the flowers have been drawn from it, and should be separated from the earth by a *Lixivium*, as other fixed Salts are made; but such a Salt would not have the same qualities as this.

G g 2

Some

Some have written, that when *Spirit of Sulphur* is poured upon *Sal Polychrestum* dissolved in water, there is made a great effervescency, as well as when the same Spirit is thrown upon *Salt-peter*: but without doubt they little examined the matter, for there is no ebullition made, neither with the *Sal Polychrestum*, nor with *Salt-peter*, they being both of them acid Salts.

The union of acid Spirits with acid Salts is very different from that between acids and alkalies; for the acid Spirits not being able to open the insensible parts of acid Salts, they do lose nothing of their strength, and their keenness remains the same, but it is not so in respect of acids mixed with alkalies, for such a penetration is made into the alkalies, that the acid loses its strength in them.

And for the reason that I have now given, the *Salt of Sulphur* is very acid, and *tartarum vitriolatum* is hardly at all acid, although there is employed proportionably as much more acid Spirit for the making *tartarum vitriolatum*, as there is for the making *Salt of Sulphur*.

The *Salt of Sulphur* is good in Tertians, and continued Fevers, and on all occasions where there is need of calming the too great motion of the humours, because the acid serves to fix the volatile Salts, or Sulphurs, which are most commonly the principal cause of these diseases.

CHAP.

CHAP. XXI.

Of Succinum, or, Ambar.

THERE is found in small currents near ^{Different} the Baltick Sea, in the Dutchy of *Prussia* ^{names of} a certain coagulated *Bitumen*, which, be- ^{Ambar.} cause it seems to be a juice of the earth is called *Succinum*; and *Carabè*, because it will attract straws; it is likewise called *Electrum*, *Glessum*, *Ambra Citrina*, vulgarly *Yellow Ambar*.

This *Bitumen* being soft and viscous, several little Animals, such as Flies, and Ants, do stick to it, and are buried in it.

Ambar is of different colours, such as *White*, ^{Divers} *Yellow* and *Black*. ^{kinds of} *Ambar*,

The *White* is held in greatest esteem in Physick, tho' it be opacous; when it is rubbed against any thing, it is odoriferous, and it yields more Volatile Salt than the rest. The *Yellow* is transparent and pleasant to the Eye, wherefore Beads, Necklaces, and other little conceits are made of it. It is also esteemed Medicinal, and it yieldeth much Oil. The *Black* is of least use of all.

Ambar serves to stop spitting of Blood, the ^{Dose.} Bloody-flux, the immoderate flux of the Hemorrhoids, Terms, and Gonorrhœas: The Dose is ^{Virtue.} from ten grains to half a drachm. It is likewise used to stop a little the violence of Catarrhs, by receiving the fume of it at the Nose,

Some do think that *Petroleum*, or Oil of Peter, is a liquor drawn from *Ambar*, by the means of

Subterranean fires, which make a distillation of it, and that *Jet*, and Coals are the remainders of this distillation.

This opinion would have probability enough in it, if the places, from whence this sort of drogues does come, were not so far asunder the one from the other; for *et oleum* is not commonly found but in *Italy*, in *Sicily*, and *Provence*. This Oil distils through the clefts of Rocks, and it is very likely to be the Oil of some *Bitumen*, which the subterranean fires have raised.

Tincture of Ambar.

THIS Operation is a solution of some parts of *Ambar*, made in Spirit of Wine.

Reduce into an impalpable powder five or six ounces of yellow *Ambar*, and put it into a bolt-head, pour upon it Spirit of Wine to the height of four fingers, stop this bolt-head with another, to make a double vessel, and having exactly luted the junctures with a wet bladder, place it in digestion in hot sand, and leave it there five or six days, or until the Spirit of Wine is sufficiently tinged with the *Ambar* colour; decant this Tincture, and put more Spirit of Wine to the matter, you must digest it as before, then having separated the impregnation, mix it with the other: Filtrate them, and distil from them in an Alembick with a very little fire, about half the Spirit of Wine, which may serve you as before; keep the Tincture that you will find at the bottom of the Alembick, in a Viol well stop.

It

It is good for the Apoplexy, Palsie, Epilepsie, *Verue.*
and for Hyfterical Women; the Dose is from ten *Dose.*
drops to a drachm in some proper liquor.

Remarks.

You must powder the *Ambar* finely, that the *menstruum* may open its body the better; this Tincture is nothing but a Sulphureous or oily part of *Ambar*, which Spirit of Wine (a *Sulphur*) does become impregnated with: A liquor that were not sulphureous would perhaps dissolve the *Ambar*, but that which is dissolved by it would be the more impure; wherefore you must always use such a dissolvent as is of the same nature with the substance that you would dissolve.

Half the Spirit of Wine is drawn off, to make the Tincture the stronger.

If you pour some drops of the Tincture of *Ambar* into a glass of Water, it will become a kind of Milk, because the Spirit of Wine being weakned by the Water does quit the Rosin or oily substance, which upon that spreads it self through the water and renders it White. But when the parts of this Rosin draw together and precipitate, then the whiteness disappears, and the water returns to its former clearness.

If you distil the Tincture of *Ambar*, and co-*Tincture of*
hobate it twice upon the dregs, or gross sub-*Ambar di-*
stance remaining in the Matraass, you shall have a *stilled and*
clear liquor, very good to strengthen watry Eyes; *cohabated,*
if the Temples and Eye-lids be always fomented *Verue.*
with it.

After the first distillation, there is at the bot-*Rosin of*
tom of the Vessel a Rosin, which is Sudorifick *Ambar.*
Verue.

G g 4

and

Dose. and Hysterical. The Dose is from six grains to fifteen.

Distillation of Ambar, and the Rectification of its Oil and Spirit.

FILL with *Ambar* grossly beaten two thirds of an earthen Retort, or glass one luted: place it in a Furnace, on two Iron bars; fit to it a large Receiver, and luting the junctures close, give under it a small fire to warm the Retort, and drive out the *Phlegm*. Afterwards augment it by little and little, there will come forth a Spirit and an Oil; continue the fire until there comes no more; then let the vessels cool, and unlute them. Pour about a pint of warm water into the Receiver, and stirring it roundly about, for to dissolve some volatile Salt that often sticks to the sides of the Receiver, pour all the liquor into a glass Alembick; fit to it a Receiver, and luting well the junctures, make a small Fire to heat the Vessel, then augment it a little, the water and Spirit will rise, and carry with them a little white Oil; continue the Fire, until there rises no more, and the thick Oil remains at bottom of the Cucurbite without boiling: Separate the white Oil that swims above the Spirit and Phlegm, and keep it in a Viol well stoppt; it is given inwardly in Hysterical Distempers, in the Palsie, Apoplexy, and Epilepsie; the Dose is from one drop to four in some appropriate liquor: it may be mixed with a little yolk of an Egg, to dissolve it easily in water or broth.

Rectification.

White Oil of Ambar.

Virtut. Dose.

The

The water and Spirit do remain mixed confusedly together, now to separate them you must pour this mixture into an earthen or glass dish, and evaporate over a very gentle Fire two thirds of it; that which remains is the *Spirit of Ambar*, keep it in a viol well stop'd.

It is an excellent Aperitive, and is given in the Jaundice, stoppage of Urine, Ulcers of the neck of the bladder, and in the Scurvy; the dose is from ten to four and twenty drops in some convenient liquor.

The *Black Oil* which remains in the Cucurbite may be kept apart for outward uses, to chafe the Nose and Wrists of women in Hysterical maladies.

If you would rectifie it, you must mix it with so much sand as is necessary to make it into a Paste, and put it into a Retort, and placing it in a Furnace in a naked fire distil all the Oil; the first that comes forth will be red, but exceeding clear, keep it by it self; It may serve instead of the white.

The *Oil of Jet* may be drawn as the *Oil of Ambar*, but because *Jet* is more terrestrious, it requires a stronger Fire.

Remarks.

The Oils of *Ambar* and *Jet* do work in Hysterical cases, chiefly by their ill smell; for we see that whatsoever is ungrateful to the smell does commonly allay symptoms in diseases of the *matrix*, and that good smells do increase them.

The reason of these effects is not very easie to find, seeing that all that has been hitherto said for explication of them has only come to this, that the *matrix* sympathizing with the brain does rise upwards.

upwards to share in the good smells of the brain, and sinks downwards when the nose is offended with that which is unpleasant. Nay some have thought the *matrix* to be a little animal, by reason of the many motions that have been observed in it. These kinds of discourses are indeed very proper to leave people in the same doubts they were in before, and I don't think any body has received any satisfaction from them. Therefore let us try whether we can say any thing more to the purpose.

First, it must be observed, that the *matrix* hath communication with the brain, by many nerves and other vessels; and secondly that the *matrix* is very often full of gross humours, which easily corrupt and are the Cause of obstructions there.

When a woman receives an agreeable smell, the tickling pleasure which this smell produces in the brain by means of the olfactive nerve, does move the Spirits and determinate them to run into the vessels in a greater abundance, and with more agility than they did before. Then also is perceived, if she minds it, a certain titillation of the parts, and all the senses do seem willing to partake of this good smell. All this is common to men as well as women.

But because the vessels which go from the brain to the *matrix* do swell with this affluence of Spirits, they must of necessity be abbreviated in their length, as a cord is found to swell and to shorten when it is wetted; or as the Fibres of a Glove do shrink when the humidity that is within them is rarefied by the Fire.

These

These vessels being thus shortned, they must needs give shocks, and receive like returns from the *matrix*. And then likewise it is perceived to rise and to move upwards. But because this *viscus* does commonly contain a gross blood, and humors very easie to ferment, which are actuated by these shocks, there do rise from it gross vapours which oppress the diaphragm, and do cause that which is called the *suffocation* of the *matrix*. These distempers do likewise very often happen to women who have no ways been offended with sweet smells, but that which causes the same symptoms does work after the same manner.

As for ill smells, they must produce a quite contrary effect, for by striking offensively the nerve of the nose, the Spirits do retire back to their places, and consequently the vessels and the *matrix* do resume their ordinary disposition.

But you will say perhaps that a grain of Musk or Civet is often applyed to the Navil, to settle the mother, and to lay the vapours.

This has been practised indeed by some, but without any proof that ever it did any good, or that it gave any ease. Civet is put into the middle of *Galbanum* Plasters, or the *Oxyroceum*, which is applied to the Navil, but there is more reason to attribute the effects which come from this remedy rather to the Plasters, than to the Civet. And besides, it cannot be said that this Civet, or this Musk thus applied do yield any good smell.

Many men are likewise very subject to vapours, and among others those that are of a Melancholick temper do seem to feel the same symptoms as women upon any sweet smells. This comes from obstructions in the vessels, which have communication

cation with the brain, for these humours which do cause the obstruction being thereby moved may produce these effects.

Spirit of
Ambar
what it is.

That which is called *Spirit of Ambar* is only a volatile salt dissolved in a little Phlegm.

Some Authors pretend, that putting this *Spirit* into a matrafs with its blind-head they can sublime a volatile salt from it as from Animals, but I could never find experience answer their pretences; for after having followed them several times in this Operation, I could never gain one jot of that salt, which hath given me occasion to examine this Spirit, and to enquire what kind of salt it might contain.

I found this salt was acid, and like unto that of Plants which is called Essential, whereof I have spoken in the principles. This salt being less volatile than that of Animals, cannot rise so high, besides that it is heavier than the Phlegm which must rise first. Wherefore to separate it, you must evaporate about a third part of the Spirit, over a very gentle fire, and then put the remainder into a cool place, and leave it there ten or twelve days without stirring it, you'll find little Crystals which you may take and keep in a Viol well stoppt. This salt has the same vertues as the Spirit: the dose is from eight grains to sixteen, in Raddish, or Pellitory water; but it is better to keep it in the Spirit, for besides that it is more easily preserved so, there always flies away some part of it with the Phlegm in the evaporation, let the fire be never so moderate. But now I shall give you a preparation of the volatile salt of *Ambar*, that may be easily made, and may keep dry.

Virtue.
Dose.

The

The Volatile salt of Ambar.

Put two pounds of *Ambar* powdered into a large glass or earthen Cucurbite, let it be filled but the fourth part, set this Cucurbit in sand, and after you have fitted a head to it, and a small Receiver, lute well the junctures, and light a little fire under it for about an hour; then when the Cucurbit is grown hot, encrease the fire by little and little to the third degree; and there will distil first of all a Phlegm and Spirit, then the volatile salt will rise, and stick to the head in little Crystals; afterwards there distils an Oil first white and then red, but clear: when you see the vapours rise no longer, you must put out the fire, and when the vessels are cold unlute them. Gather the volatile salt with a Feather, and because it will be but impure as yet, by reason of a little Oil that is mixed with it, you must put it into a Viol big enough that the salt may fill only the fourth part of it, place the Viol in sand, after you have stoppt it only with paper, and by means of a little fire, you'll sublime the pure salt in fair Crystals to the top of the Viol. When you perceive the Oil begin to rise, you must then take your Viol off the fire, and letting it cool, break it, to separate the salt; keep it in a Viol well stoppt, you'll have half an ounce.

*Spirit.**Clear Oil.**Rectification.**Quantity.**Virtue.**Dose.*

This salt is a very good aperitive, and may be given from eight grains to sixteen in some opening liquor, for the *Jaundice*, for *Ischurries*, *Ulcers in the Bladder*, the *Scurvy*, *Fits of the Mother*, and upon all occasions where there is any need of removing

removing obstructions, and opening by way of Urine.

The Spirit and Oil have the same vertues as those I have spoken of. If you would distil in a Retort the mass which remains in the Cucurbit, until there comes away nothing more, you'll have a black Oil, which might serve women to smell to in Fits.

Remarks.

White Ambar yields more Volatile Salts than any other.

The Cucurbit must be sure to be large enough, for otherwise it will break while the vapours are a rising.

Quantity. You will have five ounces and a half of a clear Oil, and one ounce and a half of Spirit, two ounces and a half of a black oil, are drawn from the mass by the Retort, and that which remains weighs two ounces; it is a black rarefied matter which burns like coals by reason of the fuliginosities that fall upon it.

Seeing it is hard to get Cucurbits large enough for such a quantity of *Ambar*, as I prescribe, you may use those of a middle size, provided you proportion the matter to them, and do not put in too much of it at a time; for all must be well heated and dissolved.

If the volatile salt be reasonably *white*, without any mixture of Oil, there is no occasion to Rectify it.

An Oil by the first distillation. A clear Oil may be drawn from *Ambar* in the first distillation by mixing the *Ambar* with an equal weight of sea-salt, and distilling it in a Retort.

tort the usual way ; there will remain likewise some volatile Salt in the neck of the Retort, which may be rectified by subliming it in a Viol, as I have said.

CHAP. XXII.

Of Ambar-grease.

Ambar-grease is a *Bitumen* found in many places on the Sea-shore, but especially in the *Indies*.

Men have thought it is found no where else but in the *Oriental Seas*, though some of it has been known to be sometimes met with upon the *English Coast*, and in several other places of *Europe*; most of it is brought from the Coast of *Melinda*, and especially at the mouth of the River that is called *Rio di Sena*.

It grows hard in the Sun-beams. The best is that which is very grey, and dry, and easily softens in the heat; when it is wet, it appears blackish.

Ambar-grease is an excellent Corroborative, *Virtus*, it is given in some liquor, or in Electuary to increase Seed: The Dose is from one grain to four. *Dose*.

Essence

Effence of Ambar-grease.

THIS Operation is an extract of the more oily parts of *Ambar-grease*, *Musk*, and *Civet*, in Spirit of Wine.

Take two drachms of good *Ambar-grease*, so much *Sugar Candy*, half a drachm of *Musk*, and two grains of *Civet*; beat them small together, and put the mixture into a Viol; pour upon it four ounces of *Spirit of Wine* well *Alcoholized*. Stop the Viol close, and set it in Digestion in horse-dung four days; then taking it out, separate that which is clear, while it is warm, for it will congeal when cold. This *Effence* works more strongly than *Ambar-grease* in substance; The Dose is from six to twelve drops in some convenient liquor.

Dose.

Remarks.

Ambar-grease alone hath scarce any smell at all but when its parts are put in motion by Fermentation, Sulphurs do rise from it which tickle the sense of smelling with a great deal of pleasure; the addition of *Musk* and *Civet* have a good effect; as for the *Sugar Candy*, it serves only to separate the rest, that they may be the more easily powdered and dissolved: for this Tincture is only a dissolution of these sulphureous matters of Spirit of Wine.

The terrestrious part which remains at bottom may be used in sweet Powders.

THE

THE
SECOND PART.*Of Vegetables.*

ALL Plants, both great and small, come from Seed, in which they are shut up for some time, as in a *Matrix*, until the saline humidity of the Earth has penetrated and softened the Skin or outer part of the Seed: It enters into the Pores of the young Plant, and gives it room to extend it self, and then it is that we begin to see its parts distinct, which before were undiscernable: Apple and Pear Trees are also shut up within their Fruit, and the Trees which bear Stone-fruit are contained in the Kernel, as well as the smallest Plant in its Seed. Plants are chiefly nourished by their Root, whose Pores are so disposed as to receive the Sap of the Earth. This Sap is exalted by the heat of the Sun, and is made to distribute it self into the Fibres of the Plant, which are as Veins and Arteries to it: In them it is filtrated, rarefied, and there it circulates, and giveth nourishment to the vegetable parts. The purest and most exalted part of this Sap goes to the Flowers and Fruit; That which is less subtle nourishes the Branches, Leaves and Root: That which is most oily forms the Gums and Resins; and the

H h outer

outer *Bark* is produced by the grosser and more Terrestrial part.

Those Plants, whose Sap is Rosinous, Oily or Gummy, commonly do grow less than others, because these fat substances stop the Pores of the Plant, and hinder the Sap from distributing it self so readily for nourishment. Therefore, in hot Countries, where the Sun causeth much of the unctuous part of the Earth to enter into Plants, Trees are often suffocated with their fatness, unless they be carefully bled by an incision into the Bark at the foot of the Tree, whence cometh the Turpentine. This Malady happens often to the Pine Tree, and it was called by the Ancients *Teda*. The *Rosins* differ from the *Gumms* in this, That they have more Oil, do dissolve more easily in Oil, and are more easily beaten or broken.

Tho' the several Plants be nourished by the same Sap, yet they have very different qualities, because the disposition of their parts is not the same, and consequently because there happen different fermentations and other elaborations amongst the insensible parts.

This diversity of the disposition of the Pores and insensible parts, is the cause why some Plants require one Climate, and others another; why some require much moisture, and others little; some fat Earth, and others a sandy or stony ground; some grow better in the Sun, and others in the shade. For this cause also some thrive better when they are cultivated, and others are the worse for it; several Plants are the better by the being situated near one another, and others only when they are at a distance.

It

It is more than probable, that every Plant has some Vertue or other to cure one or other Disease; but as yet we know only the use of some few: Nor do we know all the Vertues of any one. We are wholly ignorant of some, because we have no occasion to make experiment of them. The Life of one Man is too short to try all. Men mind only what is most necessary, and love to follow the common road of others: They use approved remedies, because there is least hazard in them: But it would contribute more to the advancement of Physick, That the Vertue of Simples were more carefully studied. As commonly there is both more Oil and volatile substance in the composition of *Vegetables*, than in that of *Minerals*, so the separation of these Principles in Vegetables is much more easie.

CHAP. I.

Of Jalap.

JALAP is a greyish Root brought out of *Jalap, America*, cut into slices and dried. Its Plant is a kind of *Solanum*, or night-shade: It grows in the Province of *Mechoacan*, and in several other places; the best is that which is most compact, and filled with Resinous Veins. It purges watery humors very well, and is therefore usually given in the Dropsie and Gout: *Virtue.* The Dose is from ten grains to a drachm in *Dose.* Broth, or White-wine.

H h 2

Rosine,

Rosine, or, Magistery of Jalap.

THIS Operation is a solution of the oily or resinous part of *Jalap*, made in Spirit of Wine, and precipitated by common water.

Put a pound of good *Jalap* grossly powdered into a large matrafs; pour upon it Spirit of Wine *Alcoholized*, until it be four fingers above the matter: stop the matrafs with another whose neck enters into it, and luting the junctures with a wet bladder, digest it three days in a sand-heat, the Spirit of Wine will receive a red Tincture: decant it, and then pour more upon the *Jalap*; proceed as before, and mixing your dissolution, filtrate them through brown Paper. Put that which you have filtered into a glass Cucurbite, and distil in a vaporous bath two thirds of the Spirit of Wine, which may serve you another time for the same Operation. Pour that which remains at the bottom of the Cucurbite into a large earthen Pan, filled with water, and it will turn into a Milk, which you must leave a day to settle, and then separate the water by inclination, you'll find the *Rosine* at bottom like unto Turpentine. Wash it several times with water, and dry it in the Sun, it will grow hard like common *Rosine*; powder it fine, and it will become white, keep it in a Viol, it purges Serosities. It is given in Dropsies, and for all Obstructions: The Dose is from four to

Verine.

Dose.

Rosines of
Turbith,
Scammony
and Benja-
min.

twelve grains, mixt in Electuary, or else in Pills. The *Rosines of Turbith, Scammony, and Benjamin*, may be drawn after the same manner.

Remarks.

Remarks.

The Spirit of Wine, which is a *Sulphur*, is likewise a very convenient *Menstruum* to extract *Rosines*, which are gross *Sulphurs*: you must use enough Spirit to dissolve all the *Rosines*, and give it a sufficient time to open all the body of the *Jalap*, after which a good part of the Spirit of Wine, is drawn off, and may serve for the same use again, provided you distil it with a very gentle fire, for if you let it be too strong, it will carry along with it good part of the *Rosine*.

A great deal of Water is poured upon it, to weaken the Spirit of Wine, which held the *Rosine* dissolved; and then it revives again, and its parts approaching one another, there is made a kind of Milk, which clears up, according as the *Rosine* precipitates.

If you have used sixteen ounces of *Jalap*, you will draw an ounce and six drachms of *Rosine* well washed and dried.

From six ounces of good *Scammony*, you draw five ounces of *Rosine* by the like preparation.

Some do evaporate the Spirit of Wine, and without using any Precipitation, they find their *Rosine* in an extract at the bottom of the Vessel, but then it becomes black like pitch.

All the Purgative vertue of the *Jalap* consists in the *Rosine*: an Alkali Salt may be drawn from the remainder but in a very small quantity.

You must observe to give the *Rosine* of *Jalap* always mixt with something else that may separate its parts, for if it be taken alone, it will be apt to adhere to the inward membrane of the Intestines,

H h 3

and

and so cause Ulcers by its acrimonious quality.

Moreover *Apothecaries* should observe to mix it in a little yolk of an Egg, when they would dissolve it in a Potion, for it sticks to the Mortar like Turpentine, when it is humected by any aqueous liquor. It may be likewise incorporated with some Electuary, and then it easily dissolves.

Twelve grains of this *Rosine* work the same effect, as a drachm of *Falap* in substance.

It is not yet sufficiently known wherein the Purgative vertue of mixts doth consist: to give it a right explication. It is easily conceived that these effects do follow the Fermentation that the Remedy hath caused, but nobody can find what it is that makes this Remedy be Purgative rather than several others, which seem to have as great a disposition as this to cause such Fermentation; wherefore I shall not pretend to clear the knowledge of this *Phænomenon*. I shall only endeavour to give some reason for a very considerable difficulty, which is to know how *Hydragogues* do work in our bodies, and why they rather purge water than other humors.

A general reason that may be given of it is that all *Hydragogue Remedies* have more acrimony than other Purgatives, and consequently they are better able to open the Lymphatick vessels.

But it may be further said that these Remedies do so cut and attenuate the Viscosities which are found in Bodies, that they make them be like water, and there is no difficulty in conceiving this last reason, when it is considered, that these Remedies which do purge water, are all of them Resinous or else Salts; for after the same manner as we see Sulphurs, or liquified Salts dissolve Sulphureous

phureous bodies, so do *Rosines*, which are Sulphurs and Salts, dissolve Viscosities in the body, which are compounded of a great deal of Sulphur.

But there is this difference between the effects of *Salt* and of *Rosines*, that the Salt passing quick, and making but little impression, doth dissolve only that which is found in what is called the first Region of the Body, wherefore it purges but mildly; whereas the *Rosine* by reason of its viscus, hooked parts, remains a longer time in the body, and leasurely causes a Fermentation not only about the parts where it immediately works, but operates on the Brain, and other remote places, from whence it forces Phlegm to discharge it self into the Belly, and this is that which causes Rosinous Hydragogues to purge more than Salts.

CHAP. II.

Of Rhubarb.

Rhubarb is a Purgative Root, brought from *Rhabarbarum China*. It takes its name from *Barbery* ^{Rum.} where it hath grown in abundance; it is likewise called *Rheum*. The best sort is that ^{Rheum.} which being broke appears of a Nutmeg colour within, which hath a pleasant Flower, but bitter to the taste. When you chuse it, take the newest and smallest pieces, and the most weighty; for the bigger pieces are often corrupted within. It purges gently by Stool, and bindeth; it is

H h 4 good

Vertue. good in a Flux, and proper to fortifie the Stomach; it helps Digestion, stays Vomiting; it killeth Worms, and is good against the Jaundice.

Dose. The Dose is from half a scruple to a drachm.
Its vertues are so many and so great, that if they were sufficiently known, and men could generally use it without that nauseousness which too commonly attends it, mankind would have infinitely less need, than they have, of the Art of Physick in most cases, and men might perhaps preserve themselves from most diseases without any other help.

Extract of Rhubarb.

THIS Extract is a separation of the purer parts of Rhubarb, from the terrestrious.

Bruse six or eight ounces of good Rhubarb, and steep it twelve hours warm in a sufficient quantity of Succory water, so as the water may be four fingers above the Rhubarb; let it just boil, and pass the liquor through a cloth; infuse the remainder in so much more Succory water, as before, then strain the Infusion, and expresse it strongly; mix your Impregnations, or Tinctures, and let them settle; filtrate them, and evaporate the liquor in a glass vessel, over a very gentle fire, until there remains a matter that hath the consistence of thick honey, this is called Extract of Rhubarb, keep it in a Pot.

Dose. The Dose is from ten grains to two Scruples in Pills, or dissolved in Succory water for diseases of the Liver and Spleen, it binds after the purging.

Præpar.

The

The *Extracts of Vegetables* are made after the same manner, except the Resinous, whereof I have spoken. Likewise waters may be used for *Menstruums*, that are appropriated to the vertue of the mixt, whose *Extract* you intend to draw.

When you draw the *Extract of Aromatics*, such as *Roses* and *Cinnamon*, the liquor may be distilled rather than evaporated, whereby you gain a fragrant water.

Remarks.

Though the name of *Extract* ought to be very general in Physick, it is confined only to one sort of Preparation that is reduced to the consistence of an Electuary, it is nothing else but a Purification that is made to cleanse a mixt from its more Terrestrious parts, that being more open and free it may work with the greater strength. Now this operation is good for mixts that are not Odoriferous, but not so for those that are; for by evaporation their best part is lost which consists in a volatile. So that I would by no means advise to make the *Extract of Aromatics*. Nature is a very good Artist to perform this Operation within our bodies, when the Principles are easie to separate, as in these sorts of mixts.

There has been a great contest among Chymists heretofore, in which of the Principles it is that the Purgative vertue of many medicins does consist. Some have maintained it to be in the Salt, others in the Sulphur, and others again in the Mercury. But when every party had very diligently separated each their Principle, and came to try it, they found after all, that none of them was Purgative;

gative; which hath perswaded many of them to think that this Purgative principle was of so subtle and penetrating a nature, that glass it self was not able to preserve it from being lost.

For my part I cannot grant any such indiscernable Purgative, and I rather am apt to believe that the Purgative virtue of a mixt consists in nothing else but such a different mixture of Principles as is requisite to produce certain Fermentations in our bodies. So that when once we separate the Sulphur, Mercury, or Salt, the position of parts, or proportion of Principles being changed, there remains no longer any Purgative effect, because the Principles being separated can no more produce that Fermentation which they did while they were mixed, and united together some kind of way that Art is ignorant how to imitate.

Perhaps some who think themselves good Criticks will say this Chapter contradicts the former; for I there maintained that the Rosine of Jalap, which is a Sulphur, doth contain all the Purgative virtue of Jalap; but though I did call the Rosine of Jalap a Sulphur, I did not mean it was a pure Sulphur, it is a substance out of which all the five Principles may be still drawn; but by reason it doth contain great store of Sulphur, this name may be given to it as it often is to others of the like nature.

And thus *Salt* may be said to be Purgative too; but it doth not follow from thence that the Salt alone must be thought to contain all the Purgative virtue of mixt bodies; seeing many plants, such as *Guaiacum*, *Box*, *Carduus*, and *Wormwood*, do contain as much, or more Salt, than *Senna*, and *Rhubarb*, and yet nevertheless do not purge at all.

CHAP.

CHAP. III.

Of the Wood Guaiacum.

Guaiacum called *Lignum Sanctum* is the Wood of a large Tree that grows in a great many places in the *West Indies*. It is likewise cultivated here in *Europe*, in *Languedoc* is good store, but that which is brought out of the hot Countries is best esteemed; this Wood is very much in use in Sudorifick Decoctions; the Bark is also used, and the Gum that runs from it: the best *Guaiacum* is that which is most compact, most Resinous, most weighty, of a brown or dark colour.

Distillation of Guaiacum.

THIS operation is a separation of the liquid parts of *Guaiacum*, from its terrestrious matter.

Take the shavings of *Guaiacum*, fill a large Retort with them three quarters full, place it in a Reverberatory Furnace, and joyn to it a great capacious Receiver. Begin the distillation with a fire of the first degree, to warm the Retort gently, and to distill the water, which is called Phlegm; continue it in this condition, untill there come no more drops, which is a sign that all the Phlegm is distilled. Throw away that which you find in the Receiver,

Spirit and
Oil of
Guaiacum.

Virtue.

Dose.

Rectificati-
on.

Dose.

Salt of
Guaiacum.

Virtue.

Dose.

Receiver, and fitting it again to the neck of the Retort, lute well the junctures: You must afterwards encrease the fire by degrees, and the Spirits, and Oil will come forth in white clouds; continue the fire untill there comes no more, let the vessels cool, and unlute them, pour that which is in the Receiver into a Tunnel lined with brown paper, set upon a bottle, or some other vessel, the Spirit will pass through, and leave the black, thick, and very fetid Oil, in the Tunnel; pour it into a viol, and keep it for use; it is an excellent Remedy for rottenness of bones, for the Tooth-ach, and to cleanse old Ulcers. It may be rectified as I said of the Oil of *Anibar*, and may be used inwardly in the Epilepsie, Palsie, and to drive forth the after-birth: the dose is from two drops to six.

The Spirit of *Guaiacum* may be rectified by distilling it by an Alembick, for to separate a little impurity that might have passed with it; it works by perspiration, and by Urine: the dose is from half a drachm to a drachm and a half. It is likewise used mixt with the water of honey, to cleanse inveterate Ulcers.

You'll find in the Retort the coals of *Guaiacum*, which you may turn into ashes by putting fire to them, which they will sooner take than other coals: Calcine these ashes some hours in a potters furnace, then make a *Lixivium* of them with water, which being filtered, evaporate it in a glass or earthen vessel in sand; there will remain the Salt of *Guaiacum*, which you may make white by Calcining it in a Crucible in a strong fire. This Salt is Aperitive, and Sudorifick; it may serve as all other Alkalis to draw the Tincture of Vegetables: the dose is from ten grains to half a drachm in some convenient liquor. The

The earth, called *Caput Mortuum*, is good for nothing.

After this manner the five substances of all Vegetables may be drawn; but because the fire doth give them a loathsome Empyreumatical smell, other ways have been invented to draw the Oil of Aromatics: I shall describe them in the sequel.

Remarks.

During the distillation of Spirits, you must not make the fire too strong, for they coming forth with a great deal of violence, would else be apt to break either the Retort or the Receiver.

Though the *Guaiacum* that is used be a very dry body, yet abundance of liquor is drawn from it; for if you put into the Retort four pounds of this Wood, at sixteen ounces to the pound, you'll draw nine and thirty ounces of Spirit and Phlegm, and five ounces and a half of Oil; there will remain in the Retort nineteen ounces of coals, from which you may draw half an ounce or six drachms of an Alkali salt.

The Oil of *Guaiacum* is acrimonious by reason of the Salts it has carried along with it; and it is the gravity of these salts that does precipitate it to the bottom of the water. The Oil of Box, and most others that are drawn this same way, do the like.

Why the Oil of Guaiacum is acrimonious.

These sorts of Oil are good for the Tooth-ach, because they stop the nerve with their ramous parts, hindring thereby the air from entering. Moreover by means of the acrimonious salts which they contain they do dissipate a phlegm which uses to get within the gum, and causes the pain, but yet

How they ease the Tooth-ach.

yet by reason of their fetid smell men have much ado to take them into their mouth.

That which is called Spirit of *Guaiacum* is nothing but a dissolution of the Essential salt of the Plant in a little phlegm.

The fixt salt is an Alkali that works much like others of that kind, nevertheless it is very probable that the fixt salts of Vegetables, let them be never so much Calcined, do always retain some particular virtue of the Plant they were drawn from.

If one would take the pains to Calcine the earth that remains, he would obtain a salt, though but very little of it.

CHAP. IV.

Of Paper.

PAPYRUS. **T**HE *papyrus* of the Antients, which gave the name to our PAPER, was a tree growing in *Egypt* near the river *Nilus*. The bark of this tree was prepared, and men did write upon it, but our paper is made of old rags or clouts, which are beaten exceeding fine in Paper-mills, and then put into the press in order to make Paper with them.

This Paper has some use in Physick; pieces of it are lighted in a room, and Hysterical women are made to receive the fume of it; they are commonly relieved with this disagreeable smell, as by many others of the like nature.

Oil

Oil and Spirit of Paper.

FOLD white Paper in to little pellets, and fill a great earthen Retort, or glass one luted, with them, place your Retort in a Reverberatory Furnace. Fit to it a large capacious Receiver, lute well the junctures, give it a very little fire for two hours only to heat the Retort; increase it with two or three Coals, and continue it so for two or three hours, then quicken it to the third degree. The Receiver will be filled with white Clouds, put out the Fire, when no more will come forth, the Operation will be ended in seven or eight hours. When the vessels are cold, unlute them, pour what you find in the Receiver into a Tunnel lined with a coffin of brown Paper, the Spirit will pass through the filter, and a thick, black, and ill scented Oil will remain within it, keep the Oil for use in a Viol.

It is a very good Remedy in Deafness, some drops of it are put into the Ear with a little Cotton, from time to time, it quiets the noise of the Ear; it is also good for Tettars and for the Itch, the parts being anointed with it; it cures the Tooth-ach, much like the Oil of Guaiacum; it is *Forme* good likewise to repress Hysterical Vapours, *tion.* Women so affected are to smell to it.

You must rectifie the Spirit, by distilling it in *Rectifica-* Sand. It is an Aperitive, and may be given where *tion.* there is occasion for a diuretick; The Dose is *Vertues* from six drops to twenty in some proper liquor. *Dose.*

Remarks.

Remarks.

The Vitriol and other drogues which are in Ink might alter the vertue of the Oil and Spirit of Paper; wherefore it is better to use clean, than written Paper. The Receiver must be large, in order to give room to the vapours to circulate in, for they come forth with that force that they would break the vessel if they had not room enough to play in; you must manage the fire with prudence, for if you make it too great the first hours, the Spirits will break the Retort.

If you have used in this Operation four and twenty ounces of Paper, you will draw two ounces and two drachms of Oil, and thirteen ounces and a half of Spirit, there will remain in the Retort seven ounces and a half of Coals.

The Oil doth not pass with the Spirit, through the coffin in the tunnel, because it is too thick, its black colour, and its ill smell, do come from the Fire: It may be rectified and rendred clearer by mixing it with ashes to make a Paste of it, and having put this Paste into a Retort, distill it in sand, by a gentle Fire, but it will still retain its colour and bad smell.

*How it
cures Deaf-
ness.*

It is good for Deafness, because that disease is often caused by a thick or phlegmatick humour which dries and hardens in the Ear so as to stop the Auditory Nerve. Now this Oil dissolves and rarefies this humor, and disposes it the better to come out. And this is the reason that it dissipates the noises in the Ears, for they were caused by winds which this humor had shut in.

The

The Spirit is very acid in comparison with other Spirits of Vegetables, because it comes from an essential Salt which has been put into a very considerable motion. Again, it is probable that by the many different forms which the Flax, and Canvas have received, in order to make Cloth, and afterwards Paper, and by the fermentations which they may have received, their fixed Salt may be volatilized, and become of the nature of that which is called Essential. Now in the distillation all this Salt has been dissolved into a liquor by the phlegm, and turned into that which is called Spirit; that which confirms me in this sentiment is that there can be hardly any fixed Salt at all drawn from the Coal which remains in the Retort, wherefore the Coal is thrown away as useless, it takes fire exceeding easily, by reason of a light Soot that is fallen upon it, and which gave it the black colour.

CHAP. V.

Of Cinnamon.

THE origin of Cannel or Cinnamon was a mystery amongst the Ancients; The Merchants who sold it did also vent many Fables about it, either thro' ignorance, or because they would conceal from others the places from whence they brought this Drug, which they sold at great prices. It has been a long time

*Whether
our Cinnamon
and
that of the
Ancients be
the same.*

time doubted, whether *Cannel*, or our present *Cinnamon* was that of the Antients; partly because of the Tales of *Herodotus*, and partly because *Cinnamon* was heretofore so rare, that it was only found with Emperors and Kings. But since the *Hollanders* and *Portuguese* have discovered by their Navigations the places where this and many other Spiceries grow, these Drugs have been much more common than they were before. And no body doubts now, but that our *Cinnamon* is the same with the Antients.

Origin of
the word.

It is called in Latin *Cinnamomum*, that is, as much as from *China*, because the Merchants who traded with *China*, sold this Bark: The Antients believed that it grew in that Country; but they were very much deceived; for it only grows good in the *East Indies*, in the famous and fertile Island of *Zeylan*, or *Ceylan*: There is some also which comes from *Java* or *Malabar*; but it is not near so good as the other.

Place where
it grows.

Description
of Cinna-
mon and
the Tree.

Cinnamon is the second Bark of a Tree as large as the Olive, whose Branches are very straight, and in great abundance. Its Leaves are like those of a Lemon Tree, but much greener: The Flowers are white and very odoriferous: The Fruit round and black, of the bigness of a Nut. There is drawn from this by expression an oily juice, which thickens and condenses like the Oil of Nutmeg: When it is heated, it hath the flavor and taste of the Oil of *Cinnamon*. The *Chingalops*, or Inhabitants of the Isle use it for fortifying the Stomach: They draw also from the Root, by incision, a liquor which smells of *Camphire*. The Wood of the Tree, when the Bark is taken off, has very little of either taste or smell; but in the space

space of Three Years it recovers a new Bark, which is as good as the first. When *Cinnamon* Bark is first taken from the Tree, it hath not so great an Odour as when it is dried; for in the drying there happens an inward fermentation, which exalts the essential parts.

To dry *Cinnamon*, it is cut into long slices, How Cinnamon is dried. and exposed to the Sun, by which means it rolls it self into that form that we see it in: But if the heat of the Sun be very great, it blackens and loses much of its volatile part: On the contrary, it becomes grey, when it is long a drying in wet weather. To dry it as it ought to be, a moderate heat is used. The best *Cinnamon* is that which is most odoriferous, piquant to the taste, and of a red colour.

Some have imagined that the Tree from whence we have the *Cassia Lignea* was the same with the *Cinnamon* Tree, and that these two Barks differ only in this, That the *Cassia Lignea* is taken from the Trunk, and the other from the Branches. The ground of this conceit was, That the *Cassia Lignea* is of the same form and colour with *Cinnamon*, but only thicker and less spirituous, as the Bark of the Trunk differs from that of the Branches, whose Principles are more exalted: But there is no such thing; for *Cassia Lignea* and *Cinnamon* come from different Trees, tho' indeed they do resemble one another very much, and do grow near one another.

The *Cassia Lignea* differs from *Cinnamon*, in that it is not so biting to the taste, smells not so strong, and becomes mucilaginous in the mouth when it is chewed, which *Cinnamon* doth not.

Both

Both *Cinnamon* and *Cassia Lignea* are good to fortifie the stomach, to help perspiration of gross humors, to strengthen and rejoice the heart, and in Hysterical cases.

Oil, or, Essence of Cinnamon, and its Aethereal Water.

BRuise four pounds of good *Cinnamon*, and infuse it in six quarts of hot water, leave it in digestion in an earthen Vessel well stop'd two days: Pour the Infusion into a large Copper Limbeck, and fitting a Receiver to it, and luting close the junctures with a wet bladder, distil with a pretty good Fire three or four pints of the liquor, then unlute the Limbeck, and pour into it by Inclination the distilled water, you'll find at bottom a little Oil which you must pour into a Viol, and stop it close. Distil the liquor as before, then returning the water into the Limbeck, take the Oil you find at bottom of the Receiver, and mix it with the first: Repeat this Cohobation until there rises no more Oil; then take away the Fire, and distil the water that remains in the Receiver, the same way I shall shew hereafter to rectifie Spirit of Wine, you'll have an excellent spirituous Cinnamon Water.

Vertue.

The Oil of *Cinnamon* is an admirable Corroborative; it strengthens the stomach, and assists nature in her evacuations. It is given to make women have an easie delivery, and to bring their Terms; it likewise encreases Seed; a drop of it is commonly mixed in a little Sugar-Candy to make the *Eleo-saccharum*, which is easily dissolved in Cordial, or Hysterical Waters.

Dose.

The

The spirituous water of *Cinnamon* hath the same vertues, but two or three drachms are required for a dose.

After this manner almost all the Oils of odori-
ferous Vegetables may be drawn, such as those of
Box, Roses, Rosemary, Lavender, Juniper, Cloves,
and Anis-seed, which do either swim above the
water, or fall to the bottom, according as they are
more or less loaded with Salts.

*Oil of
Odoriferous
Plants.*

Remarks.

You must make the Fire strong enough, for if there be not a sufficient heat, the Oil will not rise.

The Cohobation serves to open the Body the more, that the Oil may compleat its separation.

Cinnamon yields less Oil than other Woods, or Barks, and it is very difficult to draw six drachms of it out of four pounds, let it be never so good. The reason is, because much of its Oil goes away with the Spirits.

For the spirituous water of *Cinnamon* is nothing but a rarefied Oil, whose parts are separated in the water by Fermentation, so as they become imperceptible: They do make what is called a volatile Spirit, which easily mixes with all sorts of liquors, as doth the *Eleo-saccharum*; *Eleo-sac-*
for the *Eleo-saccharum* is properly an Oil, whose *charum.*
parts being separated in the Sugar, do easily mix in waters.

Tincture of Cinnamon.

THIS Operation is an exaltation of the more oily parts of *Cinnamon* in Spirit of Wine.

Take what quantity of bruised *Cinnamon* you please, put it into a Matraſs, and pour upon it Spirit of Wine one finger above it; ſtop your matraſs cloſe, and ſet it in Diſtillation in horſe-dung four or five days, the Spirit of Wine will be impregnated with the *Tincture of Cinnamon*, and become red; ſeparate it from the *Cinnamon*, and after it is filtrated, keep this *Tincture* in a Viol well ſtop't; it is an admirable Cardiack, it fortifies the ſtomach, and rejoices all the vital parts: it may be uſed like *Cinnamon* water, in a little ſmaller doſe.

Vertue.

After this manner the *Tincture* of all Odoriferous Vegetables may be drawn.

C H A P. VI.

Of the Bark of Peru.

*Quinquina
or, Kina
Kina.*

THE *Peruvian Bark*, called *Quinquina*, or, *Kina Kina* by the *French*, is a Bark that has been brought into theſe parts, ſome years ſince, from *Peru*; it retains the name of the Tree from which it is taken; the *Spaniards* do call it *I alo de Calcuturas*, or the wood againſt

against Fevers. There are two kinds of this Tree, the one is cultivated, and the other grows wild, the cultivated is much better than the other; you must chuse it of a compact substance, bitter to the taste, and of a reddish colour.

It is the most certain remedy that ever yet was known, to hinder the fits of Agues. The manner of using it for a great while past has been to give the patient the powder from half a drachm to two drachms, with a little White-wine, at the coming of the fit. But this method has been quite changed in our days, for at present we do infuse an ounce of the powder in two quarts of Wine, eight and forty hours, in a *Balneum*; the infusion is then strained, and the patient is made to drink every day three or four little glasses of it, at some distance from the Paroxysm. The use of this remedy is continued a fortnight at least.

Some do frequently add to the infusion of this Bark, the lesser Centaury, Wormwood, Chervil, Juniper-berries, the Bark of the Alder-tree, Sassafras, Salt of Tartar, and divers other ingredients, thought to be *Febrifuges*. But the basis of all is the *Bark of Peru*, the rest of the ingredients do no great good. Some do likewise mix with it a little *Opium*, but that ought not to be done without a great deal of precaution.

You must observe to purge your patient well before you give him the *Bark*, because this remedy shuts up the humors for some time, and when they come to ferment a-new, they do sometimes cause more dangerous maladies than he had before, such as *Asthma's*, Dropsies, Rheumatisms, Dysenteries, suppression of the *menfes* in women, and many other which have too too often succeeded Cures

by this *Bark*. For which reason many diseased persons have again wished for their Ague, that were cured by this remedy.

The *Bark* is likewise very ill for those who have any Abscess in their body, for it fixes and hardens the humor for some time, which afterwards ferments and causes a gangrene in the part. You must forbear the use of Milk, and aliments of that nature, when you take this remedy, by reason of their cheesie part, which would lie heavy upon the stomach, and be apt to corrupt in the vessels.

Some use water instead of Wine to make the infusion of this *Bark*: but I always observed that the Wine succeeded best, either because it draws out better the Febrifuge substance of this *Bark*, or because it is a better vehicle to make it penetrate into the body.

*Bark in a
Bulus or
Pills.*

Those who have an aversion for potions may take this *Bark*, either in a Bolus or in Pills, for which cause it must be powdered and incorporated with a sufficient quantity of the Syrup of *Wormwood*. The Dose is from half a drachm to three drachms.

*Method of
the Author
in giving
the Bark.*

I use to give a great Dose of this *Bark* in the beginning of an Ague, and the following days a small Dose morning and evening some good time before meat. The great Dose commonly carries off the Fit, and the other small ones hinder the return of it for fifteen days; for it happens very often that they return then, if necessary precautions be not used. I continue this remedy for eight days, two times a day; and afterwards for other eight days, only once a day. Thus the *Bark* is taken for sixteen days. But to assure ones health well, and to prevent the

the return of the Ague, the Patient may be made to take a drachm of the Powder of this *Bark* in white-wine or in a bolus every other twelve days together for two months.

It is probable that the *Bark* does check the humor of the Feaver, much after the manner as an Alkaly does stop the motion of an acid salt, that is to say, it unites with it, and makes together a kind of *Coagulum*; this humor does commonly remain quiet a fortnight, and the person cured does find himself a little swelled and heavy, especially if he were not purged, before he took it. Afterwards the Ague returns because the feaverish humor having been agitated by the Spirits, or else being joyned with other humors of the same nature, which having been preparing in the body during the fortnights respite, it gets quit from the *Bark*, and ferments as it did before.

But sometimes, and that especially when the body of one in an Ague has been well cleansed, if you should persist in continuing the use of the *Bark*, you will so fix the humor that you will dispose it to precipitate and be evacuated, either by stool, or urine, or by insensible perspiration, and the Ague returns no more, for the Spirits in our body do by their motion push outwards, as much as they are able, whatsoever molests the æconomy of the parts.

The *Bark* commonly operates insensibly, but yet there be some of that Constitution as to be purged with it in the beginning, especially when they take it in a potion. This Effect does a little retard its principal quality, and by this means the feaver is not so soon stayed: but however, the loss is not great: on the contrary, the feaver is more

Peruvian
bark purges
sometimes.

*It may be
mixed with
purgative
Medicines.*

more certainly cured by the Evacuation of these superfluous humours. Nor do I disprove the practice of some Physicians, on these occasions, who mix the first Doses, which they give to their Patients, with some Purgative Medicine: but to purge shortly after the feaver has been stayed by the *Bark*, is to run the hazard of bringing it back; for Purging rarefies the fixed humours, and sets them in motion.

*Clysters of
the Bark.*

As to Clysters of the *Bark*, they may be good for Children, and even for Older persons, who cannot take it at the mouth, because of their disposition to vomit, or for some other Accidents: but the smallest quantity of this febrifuge, taken any way at the mouth, produces better effects than any large quantity in Clysters, because then it distributes it self through all the body; whereas in Clysters it goes no further than the Intestines.

*Rules of
Diet.*

When the *Bark* is used, it is very proper to eat solid meat, and to drink wine, for strengthening the parts of the body, which the feaver has weakned, and that the Spirits may the more easily drive out the Disease. But yet these are to be taken moderately.

I cannot approve the Practice of those who give the *Bark* by way of precaution, to persons who are not taken ill: for I have seen some become Hypochondriack and Melancholick by the long use of this Medicine without any necessity; so that they brought upon themselves a more dangerous disease, than that which they designed to have prevented. I have also observed, that the *Bark* does hinder the growth of Children, if they have used it long.

The

The *Bark* is sometimes used in continued fevers, to lay Hysterical vapours, and for many other diseases: but if it give any relief on these occasions, it is neither so quick nor so certain as in Intermitting Fevers.

Tincture of the Peruvian Bark.

THIS Operation is an extraction of the more oily, and separable parts of the *Bark* by Spirit of wine.

Put into a Bolt-head four ounces of good *Peruvian Bark* grossly powdered, pour upon it Spirit of wine four fingers height above the matter, fit to it another matrafs in order to make a double vessel, lute well the junctures, and place your vessel to digest in horse-dung, or in a vaporous Bath, four days: stir it from time to time, the Spirit of wine will load it self with a red colour, unlute the vessels, filtrate the *Tincture* through brown paper, and keep it in a viol well stoppt.

It is a Febrifuge to be given in Agues, three or four times a day, at a distance from the Fit, and to be continued for a fortnight; the dose is from ten drops to a drachm in some proper liquor, such as Centaury water, or Juniper, or Wormwood water or wine.

If you put new Spirit of wine to the matter which remains in the matrafs, and set it in digestion as before, you will draw more *Tincture*; but it will not be so strong as the other, wherefore you must give it in a little larger dose.

*Dose.**Remarks.*

Remarks.

This *Tincture* works like the *Infusion* I now spoke of; it is a more convenient preparation than the other in this, that it can keep as long as you will, whereas the other does sower in a little time. Again those who do not love wine will like it better; but I should prefer the *Infusion* before the *Tincture*, because wine is a more proper *menstruum* wherewith to draw the saline and sulphureous substance of a mixt, than Spirit of wine.

You may steep a few Coriander seeds, or a little Cinnamon in the wine or water, and after it is strained off dissolve some sugar in it, and in this you may mix the *Tincture* of the *Bark*, and so make a kind of *Febrifugous Rossoli*, which Infants may be easily made to take of.

Extraet of Peruvian Bark.

THIS Operation is a separation of the more substantial parts of the *Bark*.

Put to infuse warm four and twenty hours eight ounces of *Peruvian Bark* in a sufficient quantity of distilled water of Nuts; afterwards boil the *Infusion* gently and strain it, make a strong exprellion of the residue, put it to infuse in new water of Nuts, boil and strain it as before, mix together what you have strained, and let them settle; decant the clear liquor, and evaporate it in a glass or earthen vessel, set in a sand-heat, unto the consistence of thick honey.

It

It is a Febrifuge that has the same virtues as *Veratrum*.
the former, the dose is from twelve grains to Dose,
half a drachm, in Pills, or dissolved in wine.

Remarks.

The Wine and Spirit of wine are very proper to draw forth the *Tincture* of the *Bark*; but they are by no means good to make the *Extract* with, because in the evaporation the Spirit carries away with it the more subtile parts of the mixt. The water of Nuts is much more convenient, for besides that it loses less of the volatile substance, it is a little Febrifugous itself. Instead of this water you might use those of *Juniper-berries*, the lesser Centaury, or Wormwood-water.

The *Extract* is convenient for those who cannot endure the taste of remedies, for it may be given in Pills wrapped up in a wafer, without partaking of the taste. But I should prefer the Infusion, or the *Bark* in substance, before this preparation, because it is impossible to avoid the evaporation of the more subtile parts in the ebullition of it, use what precaution you will to preserve them.

You may draw the *fixt salt* from the residue that remains, after you have drawn the *Extract*, or the *Tincture*. You must dry it, and burn and calcine the ashes in a crucible, then steep them in hot water ten or twelve hours, boil them an hour, and then filtrate this *lixivium*, and evaporate the water in an earthen pan or glass vessel in sand, there will remain a salt at bottom, which you must keep in a bottle well stoppt. This salt is an alkali, as are all other fixed salts drawn from plants, it is aperitive, it may be given for a quartan A-
Virius.

Salt of the
Bark.

guc;

Dose. The dose is from ten grains to a scruple in some proper liquor.

You must not think that this salt retains all the virtues of the *Bark*, they are rather all destroyed in the Calcination.

Nor may we think to separate the Febrifugous virtue of this *Bark*, by distilling it dry in a Retort; for on the contrary, this would destroy it, by breaking the natural harmony and union of its parts, and you would get only a stinking Spirit, and a burnt oil, which would be of no great use. But if by way of curiosity, you desire to Animate the *Bark*, by separating the five principles, you must distill it in a Retort, proceeding after that manner that we have prescribed for the *Guaiaicum*; out of two and thirty ounces of the *Bark*, you may draw eleven ounces of the Spirit and Phlegm, two ounces and a half of black stinking Oil, and two drachms of a fixt Alkali salt.

CHAP. VII.

Of Cloves.

CLOVES are the fruit of a tree as big as the Laurel tree, which grows without culture, in the *Molucca* Isles. Its Bark is very much like *Cinnamon*, but it tastes like the *Clove* it self. This tree sends forth a great many branches, its leaves resemble those of the Willow; they have a great flavour, and the taste as the fruit: It hath abundance of flowers, which are white at first, afterwards green, and very odoriferous;

odoriferous; and lastly, They turn into a blackish red by the heat of the Sun. Then it is that the *Clove* begins to appear, which is always at the end of the Branches of the Tree.

There is no Plant grows under the *Clove Tree*, the cause no doubt is, the multitude of its Branches, which produce the same effect as those of the *Walnut Tree*; of which I shall speak in the Remarks upon the water of *Nuts*.

When the *Cloves* fall upon the ground, they take root, and spring up in small shrubs, which in eight years time arrive at their perfect growth, and they last about a hundred years.

When the *Cloves* are gathered from the Tree, they are dried in the Sun, which blackens them: Some say, That they would moulder into powder, thro' the great heat of the Country, if there was not care taken to moisten them with Sea-water.

Cloves comfort the Heart and Stomach, and held in the Mouth in the morning, they preserve from the Contagion of ill Air. Vertue.

Oil of Cloves per Descensum.

TAKE several large drinking glasses, cover them with Linen-cloth, and tie it round each of them, leaving a cavity in each Cloth to put the powdered *Cloves* into; set a small earthen Cup upon each glass of these *Cloves*, let it stop so fitly that it may suffer no Air to enter between its brim and that of the glass: Fill these Cups with hot ashes, to warm the *Cloves*, and distil down to the bottom of the glass

White Oil. glass first a little phlegm and Spirit, and after that a clear and white Oil; continue the Fire until there falls no more, separate the Oil in a Tunnel lined with a cornet of brown Paper, and keep it in a Viol well stopd.

Vertue. Some drops of it are with Cotton put into aking
Dose. Teeth; it is likewise good in Malignant Fevers, and the Plague: The Dose is two or three drops in Balm-water, or some appropriate liquor. You must mix it with a little Sugar-candy, or a little yolk of an Egg, before you drop it into water; otherwise it will not dissolve in the water.

Remarks.

I have given you this Preparation to serve upon an emergence, when you want in haste the Oil of Cloves, you must only use hot ashes to warm the Cloves, if you desire to have a white Oil; for if you give a greater heat, the Oil turns red, and loses a good part of it. You must also take care to lift up the Cup from time to time, to stir about the powder of Cloves. The Oil of Cloves may be likewise drawn, if you please, like that of Cinnamon.

Almost all the Oil of Cloves does precipitate to the bottom of the glass by reason of the great quantity of Salt which it contains.

If you use a pound of Cloves, to distil *per descensum*, according to the description I have given, you'll draw an ounce and two drachms of white Oil, and an ounce of Spirit; there will remain thirteen ounces and two drachms of matter, from whence might still be drawn a little red Oil.

It is likely that the *Oil of Cloves* works in easing the tooth-ach much after the same manner as I said the *Oil of Guaiacum* did. But this *Oil* having an agreeable smell with it, there is no difficulty in admitting the application of this, as there was in the other.

Some do dissolve *Opium* in *Oil of Cloves*, and do use this dissolution for the tooth-ach; they do put one drop of it into the aking tooth, and this allays the pain in a very little time, by reason of the *Opium*: but there is one thing to be apprehended from this use of *Opiates*, and that is deafness, some have thereby become deaf, though indeed that rarely happens.

You may rectifie the *Spirit of Cloves* by distilling it in sand. And when you have distilled two thirds of it, you must keep it in a *Viol* well stoppt, and sling away the phlegm which remains at bottom of the *Cucurbite*. The *Spirit of Cloves* is a good stomachick, it is good to help concoction, to comfort the heart, to perspire ill humours, and to provoke Seed; The Dose is from six drops to twenty in some convenient liquor.

CHAP. VIII.

Of Nutmegs.

Nutmeg is the fruit of a Tree as big as a Pear Tree, which grows in the Isle *Banda* in the *West Indies*. It is called *Nusta*, *Nax Moschata*, *Myristica*, *Unguentaria*, and

K k

Mace.

and *Aromatites*. While it is green, it is clothed with two Barks, but when it comes to maturity, the uppermost chaps, and lets the second appear, which is tender and very fragrant. This last Bark is called *Mace*, and improperly the *Flower of Nutmegs*.

The best *Nutmeg* is that which is most weighty; it is mixed in Carminative, and Hysterical Remedies.

Male-Nutmegs.

Sometimes a sort of *Nutmegs*, called *Male-Nutmeg*, is found at the Druggists, which differs from the common sort, in that it is longer and weaker.

Oil of Nutmeg.

TAKE sixteen ounces of good *Nutmegs*, beat them in a Mortar, until they are almost in a Paste, and put them upon a Boulter; cover them with a piece of strong Cloth, and an earthen Pan over that; put your cloth over a Kettle half filled with water, and set the Kettle upon the fire, that the vapour of the water may gently warm the *Nutmegs*; when you shall find upon touching the Pan, that it is so hot you cannot endure your hand upon it, you must take off the Boulter, and putting the matter into a linnen cloth, take its four corners, and tie them quickly together; put them into a press between a couple of warm plates, set the Pan underneath, and there will come forth an Oil which congeals as it grows cold: express the matter as strongly as you are able, to draw out all the Oil; then keep it in a Pot well stopp'd; you shall have three ounces and two drachms of it. This Oil is very stomachick, being

Verm.

being applied outwardly, or else given inwardly. The Dose is from four grains to ten in Broth, *Dose.* or some more convenient liquor. It is commonly mixed with Oil of *Mastic*, to chafe the Region of the stomach. And this way the green Oils of Aniseed, Fennil, Dill, Carway and Mace, may be drawn.

Remarks.

The *Nutmegs* must be well beaten, or else they will yield little Oil; this way of warming them is called the *Vaporous Bath*.

The ordinary method is to heat the *Nutmegs* in a Kettle, and then express them strongly, but because the warming them that way carries off a great deal of its volatile parts, the Oil never proves so good, nor so clear, as when made with the circumstances I have mentioned; for thus the matter heats insensibly by the vapour of the water, and alters not its vertue in the least; and if any water doth mix with the *Nutmegs*, it is easily separated from the Oil. They who desire to have it very fragrant, may set it over a vessel of Wine instead of Water.

If you draw the Oil from sixteen ounces of Oil of Aniseed, the way I have described, you may obtain from six drachms to nine drachms and a half of it, according to the goodness of the Aniseed you use, this Oil will be of a green colour.

The Oils of Almonds, Wall-nuts, Cold seeds. *Oils without Fire.* Hazle-nuts, Poppy, and Behen, must be only beaten, and so put into the press, without heating because they do yield their Oils very easily, and because these Oils are often taken inwardly, it is
K k 2 better

better to draw them without the help of fire, to avoid the Empyreumatical impression it would otherwise take.

CHAP. IX.

Of Acorns.

AN *Acorn*, as every body knows, is the fruit of the Oak. There be two kinds of them, the Terrestrial and the Marine. The Terrestrial is used in Medicine, but the other is not much in use. Both of them are joined to the branch of the Tree by a small Bark, in which one of the ends of the *Acorn* is set; upon which account, and because also of its Figure, it is called the *Acorn Dish* or Cup.

Vertue. Both the *Acorn* and its husk are used in many astringent Medicines. It is good for the windy Colick, for the gripes of Women in Child-bed, and for the Dysentery. When it is separated from the Bark it is beat into powder. The Dose is from one scruple to four in some liquor proper for the Disease for which it is given. It is also used in some strengthening Plasters.

Dose.

The Oil of Acorns.

THIS Operation is the Oil of *Nuts* impregnated with the most oily and most essential substance of the *Acorn*.

Take

Take three and twenty, or four and twenty pounds of the best *Acorns*, dry them in the Sun, and strip them of their husks, beat them into a fine powder, and put what quantity you please into a marble Mortar, and sprinkle them with the Oil of *Nuts* newly drawn by Expression: Stir it about with a wooden Pestle, until it be turned into a Paste like that of pilled Almonds: Then beat it with the Pestle for an hour, and put it into an earthen Pot, stop it carefully, and set it a digesting a fortnight, in a *Balneum Marie*, or in hot dung, frequently stirring it about with an Ivory or wooden Spatule. Afterwards heat it in the same Pot, by a Fire somewhat greater than what is used to the *Balneum Marie*, or, *Balneum Vaporis*, and then squeeze it thro' a strong Linen Cloth whilst it is hot, or press it between two hot Plates, and there will drop out a yellow Oil.

Mix, with this Oil, a sufficient quantity of the powder of *Acorns*, to make a Paste of it, and set it a digesting a fortnight, and then press out the Oil, as before. Repeat the Infusion, the Digestion, and Expressions twice more, and then you shall have the Oil of *Acorns*, which is to be kept in a bottle.

It is good for spitting Blood, for Dysenteries and Colick. The Dose is from two drachms to an ounce. They use also to anoint the parts of the body with it, to make the skin fair and strong.

Virtus.

Dose.

Remarks.

The *Acorns* are dried to take away the phlegmatick humidity, which would hinder their Oil from mixing with the Oil of Nuts. The husks are thrown away, that only the most oily substance may be used. It is beat into powder, that it may dissolve sooner into Oil, and that the Oil of Nuts may better mix with it.

The Oil of *Acorns* cannot be drawn by expression alone, because there is in them so much Terrestrial Matter, which does quite absorb it. Indeed, if the *Acorns* be distilled in a Retort, like *Guaiacum*, the Oil may be drawn out; but it would be then black and stinking, as all Oils are which are drawn this way, nor could it serve to the uses for which commonly the Oil of *Acorns* is employed.

There is also another method of drawing the Oil of *Acorns*, which is by the help of a Copper Cucurbite and a Tin Refrigeratory, mixing the powder of *Acorns* with much water, and distilling it as we do the Oil of *Cinnamon*: but then after many distillations you only get some drops of the Oil, because this Oil, not being odoriferous, and consequently deprived of its volatile parts, is with much difficulty exalted. Moreover, it is to be suspected, that the great quantity of Water, which is used, will deprive it of its principal virtue, which consists in some essential Salts.

It seems therefore to me more desirable to have an Oil impregnated, as much as is possible, with the virtue of *Acorns*, rather than to be curious for

for one without addition, which cannot answer the ends for which it is desired. Moreover, the Oil of *Nuts*, which I make use of, has much of the vertue of the Oil of *Acorns*.

To draw the Oil of *Nuts*, take of the greatest and best *Filberd-Nuts*, break them, skin and pill their Kernels, and bruise them in a Marble Mortar until they become a Paste, and then press them between two Wooden Dishes or Plates well warmed, and so the Oil will drop out.

This Oil is good for Pains of the Breast. The *Verine*.
Dose is from two grains to an ounce. It is used *Dose*.
outwardly for smoothing, softning and strengthening the Skin.

CHAP. X.

*Distillation of an Odoriferous Plant,
such as Balm, its Extract, and
fixt Salt.*

TAKE a good quantity of *Balm* newly gathered, when it is in its vigour: beat it well in a Mortar, and put it into a large earthen Pot, make a strong decoction of other *Balm*, and pour of it into the Pot enough to sweat it sufficiently; cover the Pot, and leave it two days in digestion; then put the matter into a large *Copper Vesica*, and cover it with its Refrigeratory, or Head, tinn'd on the inside: Set it in a Furnace, and fitting to it a Receiver, lute the junctures

K k 4

with

with a wet bladder; make a fire of the second degree under it, and distil about half the water you poured upon the *Balm*, then let the Vessels cool, and unlute them: You'll find in the Receiver a very good *Balm-water*, put it into a Bottle, and expose it to the Sun five or six days open, then stop it, and keep it for use. It is used in Hysterical Maladies, in the Palsie, Apoplexy, and Malignant Fevers, it is given from two to six ounces.

Virtue.

Dose.

Express through a Linen Cloth strongly that which remains in the body, and let the expression settle; filter it, and evaporate the water with a gentle heat in an earthen Vessel, until there remains an Extract in the consistence of thick honey. 'Tis a good Remedy for such Diseases as proceed from corrupt Humors, it works by perspiration, or by Urine: The Dose is from a Scruple to a Drachm, dissolved in its proper water.

Extract of Balm.

Virtue.

Dose.

Fixt Salt of Balm.

Dry the Residue that remains after expression, and burn it with good store of other *Balm* likewise dried, you may obtain an Alkali Salt from the ashes by a *Lixivium*, the same way I spoke of concerning the Salt of *Guaiacum*.

Virtue.

Dose.

Other odoriferous Plants to be so used.

This Salt is Aperitive, and Sudorifick, the Dose is from ten grains to a Scruple in *Balm-water*.

The Water, Extract, and Salt of all odoriferous Plants, such as *Sage*, *Marjoram*, *Time*, *Mint*, *Hyssop*, &c. may be drawn after the same manner.

Remarks.

Names of Balm.

Balm is called in Latin *Apisstrum*, *Melissa* and *Melissophyllum*, that is, Honey-leaf, because the Bees love this Plant, and draw Honey out of it. It has also the name of *Citrage*, because it smells like

like a *Lemon*. There be many kinds of it, which are differently named, according to the places where they grow: but we use what is common in *France*.

It is a Plant about two foot high, whose leaves are like to those of *Calamint*, green, a little velvety, jagged or toothed, like a Saw, about the edges, and odoriferous; its flowers are small, white, or pale; and its root is Woody and Fibrous; it groweth in Gardens. It is Cordial, Stomachick, Cephalick, and Hysterick.

*Description
of balm.*

Perhaps some will think it strange that I add water for the distillation of *Balm*, but those who use to work on this sort of Herbs do know well enough, that being dry substances of themselves, there is no good distilling them without first wetting them; and besides, the water that is added doth only serve to imbibe the volatile parts, as the Fermentation operates; and when the matter is heated, the more spirituous part as being the lighter rises first, and savours much less of the *Empyreume*, than if the herb were distilled without first wetting it. The liquor, left in the Cucurbite, is not at all, or very little Odoriferous; It serves only to hinder the herbs from burning, and to make the Extract.

If you distill an Odoriferous plant or flower, which is moist enough of its own nature, so that you may extract the juice of it easily, there will be then no need of adding water, but the juice of the Plant or flower it self, will serve to wet that which remains in the Cucurbite.

You must observe in these distillations to give a fire from the second to the third degree, because if it were made too little, none of the essential or volatile

volatile Salt of the Plant would rise; and if it were too strong, the water would tast of the *Empyreume*: wherefore to make a good distillation, you must let one drop follow another slowly.

If you will be at the pains to distill the Plants, we have spoken of, in a *Balneum Maria* or *Balneum Vaporis*, there will be no need of wetting them, because there will be no reason to fear their burning; but then the operation will be tedious.

The waters so soon as they are distilled, have commonly no great smell, but when they have lain some time in the Sun, their spirituous parts that were condensed in the *Phlegm*, do display themselves, and exert their activity; for which reason it is that the water becomes fragrant which was not so before.

Another
manner of
drawing
balm-wa-
ter.

A good *Balm-water* may be also drawn by sprinkling the bruised Plant with white wine instead of any other liquor; but it is necessary to distill it in a *Balneum Vaporis* or *Balneum Maria*, because there is not enough of moisture to do it otherwise. It is not needfull to expose this water to the Sun for giving it an odour, because the spirit of the white-wine has sufficiently exalted its odoriferous particles; therefore it must be closely stopp'd as soon as it is made. This method may also serve for the distillation of other odoriferous Plants.

Magistral
or Com-
pounded
balm-wa-
ter.

Some years ago there has been used a *balm-water* which is called Compounded and Magistral, which I shall describe here.

Take *balm-leaves*, tender, green, odoriferous, and newly gathered, six handfuls, Lemon Pill two ounces, Nutmeg and Coriander, of each an ounce;

ounce; Cinnamon and Cloves, of each half an ounce: bruise all these ingredients well, and mix them together, put them into a glass or earthen Cucurbit, pour upon them two pints of white-wine and half a pint of brandy: stop the vessel well, and leave all to digestion for three days: afterwards distill it by a fire of sand, or *Balneum-Mariæ*, and you shall have an Aromatick Spirituous water, very good in diseases of the brain, Hyfterical distempers, for comforting the heart *Virtue*, and stomach, for palpitations, for faintings, for expelling Poison. The Dose is from a drachm *Dose* to an ounce.

The most odoriferous, the most spirituous, and most essential part of the Lemon is in its outward yellow Pill, and it is very proper for this operation, because its odour and quality is much the same with *Balm*. White-wine and Brandy, being Sulphureous Saline *Menstruums*, are soon filled with the Oily and Etherial salts of the Ingredients, which they exalt with them in the distillation.

The Extract doth contain almost all the Essential Salt of the Plant, wherefore it is of greater virtue than the water; you must take care to evaporate the liquor with a mild heat, for fear too much should carry off this salt, which is but too volatile of its own nature; for it is in the salt that the principal virtue of the Plant doth consist.

CHAP

CHAP. XI.

*Distillation of a Plant that is not
Odoriferous, such as Carduus Be-
nedictus, and its Essential Salt.*

TAKE a good quantity of *Carduus*, when it is in its prime; pound it in a Mortar, and fill with it two thirds of a Limbeck; draw by expression a sufficient quantity of the Juice of other *Carduus*, and pour it into the Limbeck, that the herbs swimming in the Juice may incur no danger of sticking to the bottom during the distillation: fit to it a receiver and head, and lute the junctures with a wet bladder. Distil with a fire of the second degree about half as much water as you used juice, this water is Sudorifick. It is used to drive out the Small-Pox, and in the Plague and in Malignant feavers.

Express through a cloth that which remains in the Limbeck, let the juice settle, and after it is filtrated, evaporate with a small fire about two thirds of the liquor, in an earthen or glass vessel: set this vessel in a cool place, and leave it there eight or ten days, there will shoot out Crystals round about the vessel, separate them, and keep them in a Viol well stopd. These Crystals are called the *Essential salt*; it is Sudorifick, the dose is from six to sixteen grains in its proper distilled water.

*Water of
Carduus.*

Virtue.

*Essential
salt of
Carduus.*

Virtue.

Dose.

The

The *Extract* of *Carduus*, may be likewise made *Extract*. the same way that I described for *Balm*.

Remarks.

This Plant, besides that of *Carduus Benedictus*, ^{The differ-} it has the Names of *Attractylis hirsutior*, ^{ent Names} *Acanthus Germanicus*, *Acanthium*, and *Cnicus supinus*. ^{of this} It grows two or three foot high, with several ^{Plant.} stalks, some streight, some bowed down, hairy, sharp, juicy, and bearing several small heads; its leaves are long and pointed; its flowers are ^{Its descrip-} small, yellow, surrounded with red Prickles, ^{tion.} and intermixed with a Downy matter; the seed is long, yellowish, and joyned to the head by fibres, and its root is slender. The whole Plant is bitter to the taste, and grows commonly in Gardens.

It is Sudorifick, Aperitive, and a good Febrifuge.

Succory, *Fumitory*, *Sorrel*, *Scabious*, *Cresses*, and all other Plants that are not Odoriferous, which yield good store of Juice, must be distilled like the *Carduus Benedictus*, and this method may serve to draw the Essential Salt out of any plant whatsoever.

The hot Plants have much more of this Salt than others; *Lettice* contains less than *Succory*, *Succory* less than *Sorrel*, and so of the rest.

Seeing it is in the Salt that the virtue of the plant consists, I would advise rather to use the decoction of Plants than their distilled water, when the Plants are in season; and when they are out, then to have recourse to distilled waters, and mix with them a little of their *Essential Salt*, or *Extract*.
The

The fixt Alkali Salt may be drawn from the remainder of the Plant, in like manner as I have shewed to draw that of *Guaiaicum* and *Balm*; but because much cannot be drawn from this, while it is green, therefore it is necessary to add a good quantity of the dried Plant.

Method of
drawing
the fixt
Salt of all
Plants.

When there is occasion for the fixt Salt of any Plant whatsoever, it is not needful to distill the Plant first, but only to dry it, and to burn it into ashes: Thereafter pour upon it a good quantity of boiling water; leave the ashes to steep in it, filtrate the infusion, and evaporate the humidity in an earthen Vessel, there will remain a Salt of a brown colour, which must be calcin'd in a Crucible until it turns white: The matter must be dissolved in clear water, the dissolution filtrated, and the humidity evaporated in an earthen Vessel, as before, and then you shall have a very pure white Salt, which must be kept in a glass Bottle carefully stopp'd.

Counterfeit
Salts.

Seeing very little fixt Salt can be drawn from a good quantity of Plants, and that it even requires much time and pains to do that; therefore commonly these Salts are counterfeited, and some make a good Market by that cheat. Drug-gifts, and such as trade that way, pretend to bring from far Countries, Chests with fair Crystals of the Salt of *Wormwood* and *Tamarisk*; but they contain nothing less than the Salt of these Plants. To be convinced of this cheat, several things are to be considered. First, That the fixt Salt of any Plant whatsoever, drawn by Calcination, is an Alkali, and therefore should cause an Effervescence when acids are poured upon it, which is never seen in these pretended
fixt

fixt Salts of Plants. In the next place, The fixt Salt of a Plant, being very porous, doth soon moisten and liquefie, unless it be very carefully shut up in a glass Bottle: Now these wooden Boxes, or Chests, are not capable to preserve it; it would dissolve and penetrate the Wood, before it were carried some Leagues, which never happens to these pretended Salts of the Druggists; for they keep them several years in their Boxes, or Chests, without moistning, more than what refined Salt-peter, or Alom use to do. Thirdly, The fixt Alkali Salt of a Plant is Crystallized with difficulty, and its Crystals are not of the same Figure with these counterfeited Salts of the Druggists. Fourthly, Seeing Plants yield not much Salt, and that it is expensive to make it, therefore we look upon these as counterfeited which they sell so cheap; for they sell a pound at half a Crown. I know very well, that they will say, That in the hot Countries, where this Salt is made, there be many Plants, and that they do yield much more Salt than those which grow in temperate Countries: But they who are acquainted with these Operations know very well, that how common soever such Plants be in hot Countries, that yet they do not yield so much Salt, as that it may be afforded at so small a price, especially seeing the carriage must cost something. They will perhaps tell me, that this Salt is the essential Salt of the Plant: But then it should be of more value, because less can be drawn of it. Moreover, If it were so, it could never be made so White, nor in so gross Crystals. Wherefore, after examination of these counterfeited Salts of *Tamaris* and *Wormwood*,

I am of opinion that they are only a mixture of *Alom* and *Salt-peter*, and that there is nothing of the Salt of these Plants in them; for if there was there would be some small Ebullition when acids are poured upon them: But this never happens.

For these, and many other reasons, which I forbear, for fear of being tedious, it is evident, that we ought not to use the Salts which are sold at common Druggists, who buy them at divers hands, and know not what they are composed of. It is much better to take them from such Apothecaries as make them themselves, especially when they are to be used inwardly. I say the same of all Chymical Remedies; for we cannot use too much precaution in these things, seeing their good or bad effect depends very much upon the right or wrong preparation of them.

*The Reason
why distil-
led Waters
do not cor-
rupt.*

Distilled Waters keep many years without corruption, because, by the distillation, the fermentative substances, which might cause them to corrupt, are separated; however, it is good to renew them every year, because the Winter cold does kill a great part of their active vertue: But yet for all this, they are good for moistning those Plants which are to be distilled.

The distillation of Waters, not only gives us an Idea of what passes in the World, in reference to *Rain* and *Dew*; but also it serves to explicate to us, how Fountains come to be in the tops of high Mountains; for the subterraneous Fires do heat the Waters, which are commonly in great quantity at the bottom of the Mountains, and which are very troublesome to those who work in Mines. These Waters being thus heated,

heated, do rise in vapours, and spread through the Mountain, penetrating the Earth every where. The greatest part of these vapours condense by the way, and may be the cause of the Springs and Fountains in several places where there are inward cavities: But the most heated part of these vapours mount up to the top, where they are stopt (as it were) by a kind of Refrigeratory, which receives them, and by its coolness resolves them into small drops, which grow bigger as they encrease; and at last they form themselves into a kind of streams, which finding some Aperture or Cavity, they follow that course, and turn into Wells or Fountains. These Waters very often carry with them an impression of the Metals or Minerals through which they pass, then they are Medicinal; and sometimes also they are only as other common Water.

C H A P. XII.*The Spirit of Cresses.*

TAKE *Cresses* newly gathered, while they are in their greatest prime, beat them in a marble Mortar until they become a kind of Paste: Fill the half of a large earthen vessel with them, and pour upon them the juice of other *Cresses* newly drawn, and made a little hot, until it be above the matter half a foot or
L 1 thereabouts:

thereabouts: Add to all this a pint of the *Jest* of *Ale* or *Beer*: Stir all well together, stop the vessel, and set it in the Sun, or put it into hot horse-dung for three or four days, that by either of these heats it may ferment. When the liquor has left fermenting, turn all over into a large Copper Cucurbite, fitted with a head or Refrigeratory; set the Vessel upon a *Balneum Vaporis*, and after having fitted a Receiver to the Nose of the Head, and luted exactly all the junctures, give it a gentle Fire until there distil about two pints of the liquor, which is the most spirituous part: Pour it into a Matrafs with a long neck, fit a head and a receiver to it, lute the junctures, and distil, by the *Balneum Vaporis*, about half of the liquor: You shall have a good Spirit of *Cresses*, which you must keep in a bottle well stopped.

Virtut.

It is a good remedy against the Scurvy, Dropsie, Rheumatisms, Stone, Gravel, Nephritick Colick, Jaundice, Green-sickness, Kings-evil, and obstructions of the Terms: It purifies the Blood, provokes Seed, and causeth Urine. The Dose is from fifteen drops to a drachm in some proper liquor.

Dose.

Water of Cresses.

What remains in the Matrafs is a very good Water of *Cresses*. You may also distil by a strong Fire, the humidity remaining in the Cucurbite, and you shall have a Water of *Cresses* of the same Virtue with the Spirit, but much weaker. Its Dose is from one ounce to six.

Dose.

What other Spirits may be drawn after this manner.

After this manner you may draw the Spirits of *Cochlearia*, *Eruca*, *Becabunga*, *Sinapi*, *Sisymbrium*, and other herbs which have a sharp piquant taste, whose Spirits will serve to the same uses as that of the Spirit of *Cresses*. R.

Remarks.

Cresses is called in Latin *Nasturtium*, and is a Plant so well known, that there is no need of giving any description of it.

Either Water or Garden *Cresses* may be used indifferently; for the Spirit is drawn alike from both. The Plant is beaten, and the juice of other *Cresses* with the Yest of Ale or Beer is added, to cause and forward a fermentation. The juice which is added must only be a little more than warm; for if it be either too hot or too cold, the fermentation will not come so well. The heat of the Sun or of horse-dung is also very proper to further fermentation; for we ought to imitate here natural heat: If there be too little, the parts of the matter are not put in sufficient motion; and if there be too much heat, the most subtile do evaporate when they are loosned, or rather the parts of the Plant are by this means hardned. To make this Spirit, the essential Salt of *Cresses* must be agitated, but yet so as to be contained within a sufficient quantity of gross matter, which may hinder a too quick exaltation of it: For if there were nothing to stop it, it would not have time enough to rarefie the oily parts of the Plant, with which it must mix for composing the Spirit, neither would there be a sufficient fermentation, because of the too free motion.

This fermentation therefore cometh from the essential Salt of *Cresses*, whose pointed parts, being in motion, penetrate, rarefie by little and little, and exalt the oily parts of the Plant to

L 1 2 give

give them a free passage: But seeing it is shut up in a very gross and weighty matter, it cannot move and act without heaving and swelling it. This rarefaction is common with that which happens in the juice of Grapes when Wine is made, in the juice of Apples for Cider; of Pears for Perry; when Honey is dissolved in water to make Mead; and in the decoctions or infusions of Barly, Wheat, Hop, and such like for making the several kinds of Ale or Beer. To further the fermentation of *Cresses*, I add *Yeast*, because it contains a volatile acid, very capable to put the parts in motion. In those Countries where *Yeast* cannot be had, because there is no Beer nor Ale made there, instead of it may be used sowre or leavened Paste or Dough; which is common with the *Bakers*. This addition is not necessary in new Wine, nor in the other liquors I have just now mentioned, because they contain more essential Salt, and are more disposed to motion than bruised Plants.

The Vessel must be very large, to give free room to the rarefaction, otherwise the liquor may run over. It is fit also not to stop the Vessel close, lest it break; and also that the Air may have liberty to enter, to encrease the fermentation; for the Air contains a volatile acid, very proper to put the Salts in motion.

The fermentation (as I have said) continues, and the matter swells up until the Salts have rarefied as much Oil as they are able, and until they be well penetrated together, by the sheathing of the points of the Salts into the ramous parts of the Oil: After this they are not any more in a condition of moving strongly, and so the liquor subsides and falls down. In

In Summer time, the fermentation is completed in three or four days, but it requires five or six in the Winter: As soon as the liquor is perceived to have subsided or fallen down, you must turn all over into a Cucurbite for distilling it; for if you delay it too long, the liquor sowereth, and the subtiler Spirits will evaporate. The Cucurbite and Copper head must be tinn'd within, lest the liquor take a taste of the Copper: But there is no reason to fear a taste of the Tin, because this Metal does not so soon dissolve.

The *Balneum Vaporis* is fittest for this distillation, because its heat being very moderate it raises only the most spirituous parts. The distillation may be continued until the drops be insipid and tasteless: But seeing there always arises a good deal of Phlegm with the Spirit, therefore we rectifie this distilled liquor by a Matrafs. By this means you may have the Spirit as pure as can be, for the phlegm remains in the Matrafs, not being able to rise with so small a heat: Nevertheless it must not be imagined, that there is no phlegm in this liquor, for the Spirit of *Cresses* is only a rarefaction of the Salt, and Oil of *Cresses*, dissolved and closely mixed together by some phlegm: But I would only say, That there arises no more to the top of the Matrafs than what is necessary for composing the Spirit.

The subtilty of the Spirit of *Cresses* and *Cochlearia*, and other Antiscorbutick Herbs make them very proper against such Diseases as are caused by gross and tartarous Humours: For this cause also they rarefie the Blood, and do provoke both Terms and Urine.

L 1 3

After

After the Spirit of *Cresses* is drawn, it is fit to distil a part of the humidity which remains in the Cucurbite: But this must be done by a stronger Fire; for it doth not arise so easily as the Spirit. By this means you shall have a water of *Cresses* much better than what is made the common way; for the essential Salt being loosened and volatilized by Fermentation, much of it remains with the Water: And it is only this Salt which renders distilled Waters salutary and useful; for without it they are only a pure phlegm. A part of the Water which remains in the Matras, may be kept as a weak Spirit to mix with the other.

Extract of
Cresses
and other
Anti-scor-
butick
Herbs.

After the Spirit and Water of *Cresses* are drawn, you may strain and squeeze what remains in the Cucurbite for making the Extract, after the manner of that of *Balm*: but seeing the essential Salt is the best part of this, and that it has been almost all volatilized into the Spirit when you would have the extract of *Cresses* and other Anti-scorbutick Plants, it is much better to use the juice of these Plants, that is drawn and purified without Fermentation. The same thing must be observed when you would extract their essential Salt.

CHAP.

CHAP. XIII.

Of Roses.

R OSES are divided into two general ^{Two kinds} kinds, *Wild Roses*, which grow in the ^{of Roses,} Fields in Hedges, and which are called ^{Cynorrhodon, Cy-} *Cynorrhodon*, or *Cynosbaton*, which signifie in Greek ^{nosbaton.} *Dog-Roses*; and *Garden-Roses*, which are cultivated in Gardens.

The *Wild Roses* are plain and single, they have not so much Flower as the pale *Garden-Rose*, but yet they have more than the *Red-Rose*. They are accounted astringent. This Flower does not last long, for it falls off by the least wind: The bud which remains, groweth, and ripeneth as other Fruits. It is gathered in Harvest when it is Red. It is used in Aperitive Ptisans. They also make a Conserve of it thus: They open them, and take away all the Down and Seed within; then they sprinkle them with White-wine, and leave them in a Cellar to moisten betwixt two Earthen Vessels: After this they beat them in a marble Mortar, and strain the Pulp through a Cloth or Sierce, and add a double weight of Sugar to it. This is the Con- ^{Conserve of} serve of *Cynorrhodon*, which is used successfully ^{Cynorrhodon and its} to procure Urine, for the Stone, for the Gravel, ^{Vertues,} for stopping Fluxes, spitting of Blood, and for fortifying the Stomach. The Seed of the *Cynorrhodon* is astringent, and they use it in Injections when it is decocted.

L 1 4

There

There be many kind of *Garden-Roses*. Those which are most used in Physick are the *Pale-Roses*, the *single Incarnate*, the common *White-Rose*, the *Muscad-Rose*, and the *Red-Rose*.

*Pale single
Rose, its
Vertue.*

The *single Pale-Rose* is better and much more odoriferous than those that are double, because their vertue is shut up in fewer leaves. They are much more used in Medicine than others. They are Purgative, and do rarefie and purifie the Blood: But they are ill for the Vapours. Their Scent alone sometimes rarefies the Phlegm or humor which falls from the Brain into the Stomach, as I have seen several times. This Phlegm or humor sometimes also passeth by the Nose and Spittle, and is the cause of *Rheums*. It is with these *Roses* that they make the *Syrup of Roses* and several other purgative compositions.

*Muscad-
Roses.*

The *Muscad-Roses* are so called, because they smell of Musk; their colour is white, they are later than others; for they are only blown in Harvest. They have almost the same Vertue as the *Pale-Roses*, but are much more purgative, especially in hot Countries: Three or four are sufficient to give a Purge. Sometimes the Infusion is taken, and sometimes the Conserve; and very often they cause superpurgations.

*White-
Rose.*

Common *White Roses* are very odoriferous, but they are only used for distillations.

Red-Rose.

Red-Roses are called *Roses of Provence*, because the fairest come from that Countrey: They have but little smell, and are commonly gathered when they are in the Bud, before they are fully blown; for then they are fairest and best; for if they be spread, they lose much of their colour and vertue. Their quality is astringent. The

Conserve

Conserve of Roses, Rose-honey, and divers other compositions are made of this Rose: they use to dry them, and use them in divers remedies. They are most Astringent when they are dried. It is with this Rose that the *Tincture of Roses* is made, as I have shewed in my Remarks upon the distillation of *Vitriol*.

There be many other kinds of Roses, as the *Blue* which grows in *Italy*, the *Yellow*; but we may pass them, seeing they are not used in Physick.

Rose-water.

THIS Operation is a separation of the Aqueous and Odoriferous part of the Rose by Distillation.

Take ten or twelve pounds of the most Odoriferous Roses, gathered a little after Sun-rising in dry weather: clean them of their Buds and Husks, and bruise them in a Marble Mortar till they become a kind of Paste: then put them into a large Copper Cucurbite, tinned within, and pour upon them the juice of other Roses of the same kind, newly drawn, untill they be sufficiently moistned. Fit to the Cucurbite a *Moor's-head*, tinned also within, with a Refrigeratory and Receiver. Lute the junctures, and give a gentle fire, taking care to change the Water in the Refrigeratory when it is hot. When you have distilled about half the liquor, you must remove the fire, lest the matter fasten to the bottom of the vessel: separate your vessels; strain and squeeze what remains in the Cucurbite. Pour back into the vessel the juice or liquor which is by this means

means expressed, and distill about two thirds of it by a small fire; you shall then have a very good *Rose-water*, which must be put into bottles, and set in the Sun for some days unstopp'd, giving it a greater scent: therefore stop them and keep them. This *Rose-water* is used for fortifying the breast, heart, and stomach, for curing fluxes, spitting of blood, and other Hemorrhages. The Dose is from one ounce to six. It is also used in Injections, for stopping Gonorrheas: they use also to wash the eyes with it in the small Pox, in Inflammations and for curing of redness and other Distempers, mixing it with *Plantane-water*.

Virtue.
Dose.

Extract.

The liquor which remains in the Cucurbit after distillation, may be strained through a bag or cloath, and the humidity evaporated in an earthen vessel by a small fire of sand until it comes to the consistency of Pills. And this is the *Extract of Roses*. It is a little purgative, and is either given in Pills or dissolved in *Rose-water*, to purge Choler, and to purifie the blood. The Dose is from half a drachm to two drachms.

Dose.

After the same manner you may draw water of other juicy flowers, and make the extract of them.

Remarks.

Pale-Roses and *White single Garden-Roses* are the best for making a good odoriferous *Rose-water*. But if you would have a Water for the eyes, it will do better to make it of wild *Roses*, and also of the green Husk, Beards, Cups, and small button, which remain after the leaves of the *Rose* are taken away. To make this water this is the way,

way,

way. Bruise them all together in a marble mortar, and wet or moisten them with a strong decoction of others, and leave them thus for four and twenty hours; then distill the humidity after the usual manner. This water is more deterfive and more astringent than *Rose-water*.

It is best gathering *Roses* newly spread a little after Sun-rising, because then they are impregnated with something of the Spirit of the Air by the dew of the night, which is very much dissipated by the heat of the Sun. It is also only proper to gather them in a dry season; for rain moistens them too much and takes away their virtue.

If you would have the juice of *Roses* easily, *Take this way.* First bruise them in a mortar, and leave them to ferment eight or ten hours in a Pot or earthen Vessel, then squeeze or strain them strongly through a napkin or linnen cloth. This fermentation subtilizes and attenuates the viscus parts of the *Rose*, and turns them into a thin fluent liquor. If you squeeze them as soon as they are bruised, before the fermentation, they will yield little juice, and also the cloth will be ready to rend before you get any.

When the *Roses* are not first moistned, they must be distilled in a *Balneum Marie* or *Balneum Vaporis*; for if you set the vessel upon a Naked fire, they will fix to the bottom, and the water will have something of a burnt smell.

Those who have a large vessel for the *Balneum Vaporis*, such as has been described in the figures of this book, ought to use it for this distillation, whether they moisten the *Roses*, or use them without such addition; because *Rose-water* made by

by this heat is sweeter, and hath a more agreeable scent than any other, for it hath less impression of the fire, and the Phlegmatick parts do not so much mix with it: But seeing these vessels are not common with Apothecaries, and that the most part are satisfied with a Cucurbit of Brass tinn'd and its refrigeratory, for distilling the waters at a naked fire; therefore I have shewed the most proper way of making *Rose-water* by this vessel, which may be pure, and as agreeable to the smell as can be.

Seeing the refrigeratory serves only to condense the vapours, and to hinder the distilled water from smelling of the fire, therefore it ought always to be kept cool; and so whenever the water in it feels hot it must be changed. The *Rose-water* which is first distilled is most Odoriferous, because the most Volatile parts ascend always first. But when either the one or the other is exposed sometime to the Sun, they acquire an agreeable odour; for the heat of the Sun rarefies and volatilizes the insensible Particles of the Rose, which have passed into the water by distillation, and renders them disposed to be exalted, and to tickle agreeably the Olfactive Nerve when it approaches to it.

When you would only make a small quantity of *Rose-water* it is better to use vessels of Earth or Glass than those of Metal, because there is less fear of an Impression from those than from these: and the distillation should be made with the *Balneum Vaporis* or *Balneum Mariæ*.

Some, in the distillation of Roses, use only a flat Copper Vessel, tinn'd within, into which they put *Rose-leaves*, without bruising them. They

They fit to the vessel a Tinn head or a Copper one tinn'd, and so distill a little *Rose-water* by a small naked fire : and when they take off the head, they find the *Roses* baked into the form of a *Cake*, which is called a *Rose-cake*, and which they dry in the Sun, and keep to be used in Fomentations, boiling it in Wine for strengthning. Those who do not care for the *Rose-cakes*, turn the *Roses* in the vessel untill the whole humidity be distilled. When this kind of distillation is used there is need of Patience; for it is tedious : and if you add but a little too much fire, the water will have a burnt smell ; therefore the safest and surest way is to do it by a *Balneum Vaporis* ; for the Operation is not so long, and you may give what heat you please to the water, without running any risque of a burnt smell.

Rose-water may be also made *per Descensum* after the following manner.

Take a large earthen Pot, wide at the mouth ; cover it with a clean linnen cloth, which must be tyed round about the mouth of the vessel, and made so to hang within the Pot as that there may be a cavity in it : fill this cavity with *Rose-leaves*, about two fingers height ; then set above them a flat dish or earthen vessel, which may joyn close to the mouth of the Pot : let it be warm, and put into it hot ashes or some live coals, so that they may heat the *Roses* : the vapour which this raises cannot ascend because of the bottom of the Plate or dish which lies upon the Pot, and therefore it doth precipitate and distill downwards into water within the Pot. Continue the same degree of fire, and change the *Roses* when they are dry, until you have enough of distilled water.

After

*Distillation
of Rose-
water per
descensum.*

After this way you may draw *Orange-Flower Water*, but the quantity will be small: And seeing this Water is of great use, such means may be used as may afford a sufficient quantity of it, of which I shall speak afterwards.

Seeing *Rose-Water* is not much used but in astringent Remedies, therefore it ought to be drawn from Red astringent Roses rather than Pale ones, which are purgative. But because this is not so very odoriferous, therefore some do not value it; which obligeth them to draw it of *Pale-Roses*: And hence it is, that common *Rose-water* doth more frequently loosen than bind.

How to
draw the
Water of
odoriferous
Flowers
which have
little moi-
sture.

Water of
Roots and
Seeds;

When you would draw the water of odoriferous Flowers, which have but very little aqueous moisture, such as the Flowers of *Lavender*, *Betony*, *Stæcas*, *Mugwort*, *Thyme*, *Sage*, *Rosemary*, they must be sprinkled with White-wine, and left to macerate together for two days; then distil them by a *Balneum Mariæ*, or, *Balneum Vaporis*. After this manner the water of Roots and Seeds may be drawn, which may be sprinkled with common water instead of White-wine, when it is more convenient.

Spirit of Roses.

THIS Operation is the exaltation of the oily, subtile, and essential parts of the Rose into a liquor.

Take fourteen or fifteen pounds of pale single Roses, which are most odoriferous: Let the whole heads be entire, *i. e.* with their husk, Cup, and

and little button: Bruise them well together, and put them in a large earthen Pot, whose third part at least remains empty: Pour upon them six pints of the juice of other Roses of the same kind, which must be first heated and mixed with half a pint of *Tell*: Stir all well together with a stick, and stop the pot closely; then leave the matter in digestion in hot dung for three or four days, or until it hath acquired the scent of Wine: Thereafter put it into a *Balneum Vaporis* to be distilled, taking care to close the junctures and to manage the Fire gently, that only the most spirituous parts may ascend. When you have distilled about four pints of liquor, take away the Fire, withdraw the Recipient, and rectifie what remains within the Matrafs, as I have shewed in the Rectification of the Spirit of *Cresses*. You shall have a Spirit of Roses very odoriferous and inflammable, which must be kept in a glass Viol well stopp'd.

It fortifies and chears the Heart and Stomach, whether applied inwardly or taken outwardly: It is given to Men in Sincopies and Palpitations: But it does not very well agree with Women, because it raiseth Vapours in them. The Dose is from half a drachm to two drachms in its own water.

If you squeeze what remains in the Cucurbite, after the distillation of the liquor, and mix it with what remains in the Matrafs after the rectification of the Spirit, you shall have a very good *Rose-water*.

After this manner may be drawn the Spirit and Water of other odoriferous Flowers, Herbs, and Seeds: But seeing the most part of them have

Virtue.

Dose.

*Water of
Roses.*

have but little juice, therefore they must be first moistned with Water or White-wine.

Remarks.

Seeing the Spirit of *Roses* is only an Oil, rectified and exalted by the essential Salt, therefore the oily parts contained in the Knob or Button of the Rose are very proper for this Operation, which is the reason why I use the Rose entire. The Pot or Vessel must be very large because of the Fermentation which swells the matter: The *Yeast* of Ale or Beer contains a picquant volatile Salt, which is very capable of setting the bruised *Roses* in motion, and it is only added to forward a Fermentation.

The Spirit of *Roses* may be also made after the following manner.

*Another
manner of
making the
Spirit of
Roses.*

Bruise twenty or thirty pounds of *Pale-Roses*, until they become a Paste; put them into a long earthen Pot, such as Butter commonly is kept in: Lay above it a common Salt powdered, a finger deep; stop the Pot close with Cork and wet Clay or Pitch: Then set the Pot in a cool place, and leave it there for two Months. After this open the Pot, and distil the humidity of the *Roses* by the *Balneum Vaporis*. What comes first is the Spirit, which must be rectified as the former.

There be many odoriferous Flowers, as, *Jessamin, Violet, &c.* from which no liquor can be distilled that retains any smell like the Flower. Now the cause of this must not be ascribed to the evaporation of the subtle parts, but to the Fire, which confounds the volatile substance of these

these Flowers with their viscous parts, and which changeth the disposition that they had before.

A small quantity of the Oil or Essence of Roses may be drawn after the following manner.

Beat in a Mortar, a good quantity of *Pale-Roses*, the whole heads entire, with the little green Leaves, Husks, &c. Then put them to steep four and twenty hours in a good quantity of water, and thereafter distil them by a great Fire, after the usual manner, and you shall find upon the distilled water, some drops of a very odoriferous Essence, which must be taken off with a little Cotton. Pour back again the distilled water upon the residue of the Roses, and distil the liquor over again, that you may have some more drops of Essence, which must be kept in a Viol well stopped. It hath the same vertue with the Spirit, but it is stronger. The Dose is from two drops to six in some proper liquor.

There is more of the Spirit and Oil of Roses drawn in hot Countries than in temperate ones.

CHAP. XIV.

Of Orange-Flower Water.

TAKE six pounds of *Orange-Flowers* when they are in their prime, bruise them in a marble Mortar, and put them into an earthen Pitcher, add to it six ounces of the Pill of bitter or *Sevil* Oranges, cut into small slices:

M m

Pour

Pour upon this White-wine and *Balm-water*, of each four pints: Stir all with a stick; and having stopp'd the Pitcher closely, put it to a digestion in hot dung for two days: Then open the Vessel, and turn over quickly the whole matter into a large Cucurbite of Glass or Earth, sitting to it a head and receiver, and luting the junctures closely. Set the Cucurbit into a *Balneum Mariæ* or *Vaporis*, and distil the humidity by a strong Fire. You shall have a very good *Orange-Flower Water*, which must be kept in a Bottle well stop'd. It is call'd the water of *Naphta*.

Virtue.

It is good against Vapours and the malignity of Humors: It is given in Hysterical Distempers, to provoke Womens Terms, and to fortifie the Stomach and Brain. The Dose is from two scruples to an ounce.

Dose.

Remarks.

Seeing *Orange-Flowers* are very dear, and that commonly the Water is very cheap, it is no wonder that it is generally ill made; for, for the most part it is only a small infusion of *Orange-Flower* in common Water distilled. That which is prepared, after the manner I have now shewed, will have more vertue than any other.

The first Pill of the *Orange* has most Essence in it, and therefore it is preferable to the other parts: It gives a good Flavor to this Water: And if you have some small *Oranges*, about the bigness of a Nut, to add to the infusion, after having bruised them, the water will be much better. *Orange-Flowers* have more strength and odour in *Languedoc* and *Provence*, than at *Paris*;

and therefore the best comes from thence.

Orange-Flower Water may be made without addition of any humidity; but it will not be the better for that; because a part of the Essence would remain in the residue. *White-wine* and *Balm-water* dissolve and rarefie the odoriferous parts of the Ingredients, and render them more sensible to the Sence of smelling than otherwise they would be. If *Balm-water* be wanting, common water may be used in its stead, or rather double the Dose of *White-wine*.

They who would have the Spirit of *Orange-Flower* need only to put *Orange-Flower Water* into a Matraſs, with its proper head and receiver, and to distil by a *Balneum Vaporis*, about the fourth part of it: And this is the Spirit of *Orange-Flower*. It has the same vertue with the *Water*; but seeing it is much stronger, the Dose must be so much the less.

You may also draw an Oil, or odoriferous Essence of *Orange-Flower*, by steeping the same in common water, and distilling it by a great Fire, after the manner of drawing the Oil of *Cinnamon*. But it is fit to add to the Flower some small *Oranges* bruised, and a good quantity of the first Pill of common, bitter or *Sevil Oranges*, because there is much Essence in them. After the distillation you will find, the Essence swimming upon the water, which must be taken off with a little Cotton, and kept in a Bottle well stoppt. It serves for the same uses as the Water. The Dose is from two drops to six in some proper liquor. But seeing it does not easily dissolve in liquors, therefore it may be made into an *Oleo-saccharum*, by mixing it with a little *Sugar-Candy*,

M m 2

Candy,

Candy, which divides and extends the parts of the Oil, and makes it dissolvable. This Essence is also used for perfumes; for it is the true Essence of *Orange-Flower*: But that which *Perfumers* commonly use, is only the Oil of bitter *Almonds*, to which they give some Scent of the *Flower of Orange*.

CHAP. XV.

Distillation of Strawberries.

TAKE a good quantity of ripe *Strawberries*, bruise them well, and put them into an earthen Pitcher so large that only two thirds of it may be filled with them: Stop well your Pitcher, and set it digesting in hot dung for three or four days, or until the matter smells like Wine: Then pour over the matter into a Copper Cucurbite tinn'd, and having fitted it with a Head, Refrigeratory, and glass Receiver, and luted the junctures closely, distil the liquor by a *Balneum Vaporis*, and you shall have a spirituous Water of *Strawberries*, which is good to strengthen the Heart, and Brain; to purify the Blood, and to provoke Urine. The Dose is from half a Spoonful to two Spoonfuls: It is also used for cleaning and beautifying the Skin.

After the same manner you may make a good water of *Raspberry*, which has the same virtues.

Vertue.

Dose.

If

If you desire the Spirit either of *Strawberries* or *Rasberries*, put the distilled Water of them into a Matrafs with a long neck, and fit to it a Head and a Receiver, and lute the junctures closely: Then set the Matrafs upon a *Balneum Vaporis*, or upon a large Pot half filled with Water, whose mouth is proportion'd to the bottom of the Matrafs, so that it may lye upon it without touching the Water: Then give a Fire to it, and distil the most spirituous part of the Water. When there is about the eighth part in the Receiver, take away the Fire; for then you have the Spirit of *Strawberries* or *Rasberries*. They have the same vertue with the Water, and the Dose is from half a drachm to two drachms in their own Water.

Vertue.

Dose.

Remarks.

Strawberries and *Rasberries* are more used at Meals, Collations, Entertainments, than in Remedies. When they are very ripe, they clear the Senses of Seeing, Smelling and Tasting. They have a Taste as Wine, and do strengthen the Heart, Stomach and Brain, as the several sorts of Wine. The common way of drawing the Water of *Strawberry* and *Rasberry* is only to bruise the Fruit, and to distil the humidity, by the *Balneum Vaporis*, without suffering them to ferment. But then this Water is less spirituous.

Others steep the bruised Berries four and twenty hours in white Wine, and then throw them into a Cucurbite of Earth or Glass, for distilling the humidity. This Water is good to take in-

M m 3

wardly;

wardly : The Spirit of Wine which mixes with it in the distillation serves for a Vehicle.

Others infuse their bruised Berries in Asses Milk, and then distil it. This Water is good for beautifying the Skin.

The method which I have prescribed is preferable to all others, because the parts of the *Strawberry* are this way exalted by Fermentation, without the addition of any liquor. Nevertheless, I would not think it amiss to add a little white Wine to the bruised Berries, that the matter being made more liquid, it may ferment the more easily.

The ripest Berries must be used, because they are most disposed to fermentation. I leave a third part of the Pitcher empty, because the Fermentation swells the matter. The heat of dung is very proper to put the parts into motion: It is a true heat of digestion.

The essential Salt of *Strawberries* doth here what that of *Grapes* doth in new Wine when it ferments, that is, it rarefies the parts of the Oil, and turns them into a Spirit: But because there is less of this principle in *Strawberries* than in *Grapes*, therefore the fermentation is not so strong, neither can there be so much Spirit drawn out of them. The waters of *Strawberry* and *Raspberry* which are sold in *Coffee-houses* and such like places, are only the juices of these Fruits, mixed with so much Water and Sugar, as is sufficient to make an agreeable liquor, which they also purifie and set amongst Ice, to cool and congeal them; and sometimes also to render them the more pleasant, they give them some sweet odours.

To

To get the Juice of these Fruits easily, there is no more to do but to bruise them and to mix them with Water: And when they have steep'd together for some hours, squeeze them very strongly, and the liquor will run out.

CHAP. XVI.

The Water of Walnuts.

Bruise in a Mortar, ten or twelve pounds of *The first*
walnut-Flowers, while in their prime; *Water,*
put them into a large Copper Cucurbite,
tinn'd within. Make a strong decoction of other
walnut-Flowers, and having strained it, pour it
upon the Flowers in the Cucurbite, until they
swim in the liquor: Fit to the Cucurbite a
Bolt-head with a Refrigeratory and glass Re-
ceiver: Lute the junctures: and having set the
Vessel upon a Furnace give it a small fire, until
about half of the liquor be distilled. Then let
the Fire go out, and squeeze what remains in
the Cucurbite, and what is expressed from it,
return into the Cucurbite, and distil about two
thirds of it. Mix these distilled waters together,
and keep them.

Strain the liquor which remains in the Cu- *Extra.*
curbite, and let it rest for some while; then pass
it through a woollen Cloth and evaporate the hu-
midity in an earthen Vessel by a Fire of sand,
until it comes to the consistency of Pills. This is

M m 4

the

the extract which must be kept. You may also dry what remains of the flower, and keep it.

*Second
water.*

Gather *Walnuts* while they have attained but to the third part of their common growth; bruise them in a mortar, and fill the half of a Copper Cucurbit tinn'd with them: then pour upon them all the water which was drawn from the flowers. Fit to the Cucurbit a Moor's head with a Refrigeratory and Receiver: and having left the matter in digestion for four and twenty hours, proceed to the distillation and to the making of the extract as before: Dry also what remains of the Nuts, and keep all together.

*Third
water.*

Take a sufficient quantity of Nuts, when they are ripe enough to be preserved; bruise them, and put them into a Copper Cucurbit tinn'd, so as to fill only the third part: Pour upon it the second water which was distilled: Cover it with a Moors-head and Refrigeratory, and leave the matter in infusion four and twenty hours: Fit a glass receiver to the nose of the Moors-head, and proceed to distill the humidity as before. You shall have a very good water, which is called the water of *Three-nuts*.

Virtue.

It is good to procure sweat: It is given both in Intermitting and Malignant fevers, in the Plague, and small Pox. It comforts the stomach, and gives ease in windy Colicks, and in Hysterical vapours. It is also used against the biting of venomous beasts. The Dose is from one ounce to seven.

Dose.

*Extract of
Walnuts.*

Strain and purifie the liquor which remains in the Cucurbit after distillation, and evaporate the humidity in an earthen vessel by a fire of sand, untill it have the consistency of a syrup. Then

mix the two former extracts with it, and make one extract of all the three substances, by setting the earthen vessel upon a fire, and drying the matter into a consistency of Pills. Keep this extract in a Pot.

It is Sudorifick, Aperitive, and a Febrifuge. *Vertue.*
It is given to take away obstructions, to expell *Dose.*
the malignity of humours, and to comfort the stomach. The Dose is from a scruple to a drachm, either in a Pill or dissolved in its own water.

Dry, at the Sun, the husks and shells of the *Salt of*
bruised Nuts, and mix with them what remained *Walnuts.*
of the Nuts and flowers of the former operations; burn them, and infuse the ashes in common water boiling; then filtrate this water, evaporate *Vertue.*
the humidity, and you shall extract a Salt. It is good against obstructions. The Dose is from six *Dose.*
grains to a scruple.

Remarks.

The Walnut is called in Latin *Nux Juglans*, *quasi Jovis glans aut glans juvenans*, because of its excellency, and because it serveth to many uses, as well in Arts as in food and Physick. It would be to no purpose to give a description of the tree which bears this fruit, seeing it is so very common. There scarce grows any Plant about the *Walnut-tree*, either because a certain vapour or spirit ariseth from the root, which killeth them, or because the tree it self being very high, its branches large and its leaves broad and oily, it doth so overshade the place, that neither the Sun nor spirit of the Air hath free access to these small Plants for nourishing them.

The

The flower of the *walnut* has not much juice in it, and therefore it must be moistned with the decoction of other flowers, otherwise it would stick to the vessel in the distillation, and make the water have a burnt smell.

When the Nuts have only attained to a third of their growth, they are then filled with a viscons juice, which the digestion (after they are bruised) rarefies; so that the principles of their composition are loosned and volatilized: but yet it is fit to help on the distillation by a strong fire, to elevate some portion of the essential salt of this fruit; for the principal vertue of the water consists in this salt.

The *Walnuts*, which are gathered for preserving, are better for distillation than those that are fully ripe, because not being so hard, the principles are more easily extracted: yet when the first is wanting we may make use of the other. The husk or outer skin must not be thrown away; for it addeth a great vertue. A pretty strong fire must be used, but yet with such caution that the matter may not stick to the bottom of the vessel. The water which is distilled so many times is of a red colour, because there always ascends some oily part with it. This water has as much vertue as any distilled water can have; for it is impregnated with the whole substance of the Nuts; but you may give a considerable addition to its vertue by dissolving the extract in it, or the Salt, when you are to use it, observing the prescribed Dose; for by this means you heap together the whole vertue of the *Nut*. The extract contains the greatest part of the essential Salt, which could not be exalted by distillation. The salt which

which is got by the Calcination of the Mass or residue of the three operations is an Alkali, as all the other fixt salts of Plants are. It may have retained some virtue of the Nut: but however, all these salts are aperitive, penetrating and dissolving of themselves.

The green husk or outer skin of the Nut serves for dying and tinctures: the shell which is as it were the second bark, is used in sudorifick decoctions; the oil of the Nut, which is drawn by expression, is very good against windy and Nephritic Colicks, and for curing the gripes of women newly delivered: They mix it with Clysters. It is also used for beautifying the face when newly drawn without fire.

CHAP. XVII.

A Vulnery or Gun-shot Water.

TAKE of the leaves and roots of Walwort or Comfrey, the leaves of Sage, Mugwort, Bugle, of each four handfuls; the leaves of Betony, Sanicle, Ox-eye or great Margaret, little Margaret, water Betony or Figwort, Plantane, Agrimony, Vervain, Wormwood, Fennil, of each two handfuls; Saint John's wort, Astrologe or Birth wort, Orpin, Fluellin or Speedwel, little Centaury, Milfoil, Tabacco, Mouse-ear, Mint, Hyssop, of each an handful. Cut them all, and bruise them well together in a Mortar: Put them into a large earthen vessel, and

and pour upon them twelve Pints of white Wine: stir them with a stick, and stop the vessel, and set it a digesting in hot dung or some other like heat for three days: then turn all over into a large Copper Cucurbit, tinn'd within, and having fitted to it a bolt-head, refrigeratory, and receiver, proceed to distil the humidity by a gentle fire after the usual manner, and then you shall have a *Vulnerary* or *Gun-shot water*, which must be kept in a bottle well stopp'd.

Virtut.

It is good for contusions, dislocations, and discharging tumours outwardly apply'd; it cleanseth wounds, old ulcers; it reneweth the flesh and strengtheneth; it hinders putrefaction, and stoppeth Gangrenes; and it may be also used against vapours.

Remarks.

The Names of this water shew its vertue; for *Vulnerary* signifies to heal a wound, and *Gun-shot* is added, because it is used very successfully for such wounds as come that way.

Comfry.

Great *Comfry* is a Plant very common, which grows in watry or marish places: In Latin it is called *Symphytum*, *Consolida major*, or *Auricula Asini*. Its leaf is long, and much like to that of *Bugloss*. Its flower is white or reddish, its root long and black without, but white within. It is glutinous, and very proper to close up flesh. It stops Hemorrhages and the flux. It contains little salt, but much Oil and Phlegm.

Virtue.

Sage.

Sage is called *Salvia quasi Salvatrix*, because it is esteemed good for many diseases. There be two sorts of it, the *Wild* and the *Garden Sage*; there

there are also two kinds of *Garden-Sage*, the great and the small; the last is the best, and it is *it* that is used for the making of this water: It is full of an oil exalted to a Spirit; and hath much Salt, but little of the passive principles: It is Cephalick, good for the Nerves, Hysterick, Stomachick, and Aperitive. *Vertue.*

Mugwort is in Latin *Artemisia* from a *Queen* *Mugwort* of that Name who used it. It is a Plant which grows high, whose leaves are whitish, and as it were cut, and slashed like those of Wormwood: They are also odoriferous. It grows every where: and upon Saint *John's* day they use to make Garlands of it. It contains much Salt, but little Oil and Phlegm. It is Hysterick, Aperitive, and Vulnerary. *Vertue.*

Bugle has in Latin the names of *Bugula*, *Confolida media*, *Symphytum medium*, *Prunella Cerulea*, and *Herba Laurentiana*. It is a Plant whose leaves are thick, long, reddish, and a little teethead at the edge. Its flowers are blue. It grows in the fields, and contains some Salt and Oil, but much of the passive principles. It is Vulnerary, and good against the diseases of the lungs, and proper to comfort and strengthen. *Vertue.*

Betony in Latin *Betonica*, is a Plant which grows in woods; its leaves are green, long, and teethead about like a Saw. Its flowers are Purple, and formed like an ear. It contains an exalted oil, an essential and volatile Salt, but little fixt Salt, Phlegm or earth. It is Cephalick, Cordial, and Vulnerary. *Vertue.*

Sanicle, which in Latin is called *Sanicula* or *Diapensia*, is a Plant whose leaves proceed from the root, almost round, firm, close, of a fair Greenish

Greenish colour, divided into five parts: Its stalk is about a foot, or a foot and a half high, on which there are small white Flowers. Its Root is black without, and white within, and full of Fibres. It grows both on Mountains and in Valleys. It contains a good quantity of Salt and Oil, much Phlegm and little Earth. It is Astringent, Vulnerary, good in Ruptures, and may be used both outwardly and inwardly.

Virtue.

Ox-Eye, or Great Margaret. *Ox-Eyes, or Great Margaret,* is called in Latin *Bupthalmum*, or *Bellis Major*. It is a Plant which grows commonly every where. Its Leaves are long and toothed. Its Flower is yellow, and formed like an Ox-eye, whence it hath its name. It contains much Oil, and an indifferent quantity of Salt and Phlegm. It is Vulnerary, and used in the Kings-evil.

Virtue.

Little Margaret. *Little Margaret,* whose Latin name is, *Bellis minor*, or *Symphytum minus*, it is a Plant so common, that it is known to all the World. There be two kinds of it, one very low, which grows naturally in the high ways, and another larger and more agreeable to the sight, which is planted in Gardens: The first kind is the best, and most used in Medicin. It hath long Leaves, Flowers of a different colour, and which form, as it were, so many small eyes: Its Root is bushy. It contains little Salt and Earth, much Oil and Phlegm. It is used to stop Blood, to heal Wounds, to discuss Tumors, and to cure the inflammation of the Eyes.

Virtue.

Water Betony, or Fig-wort. *Water Betony, or Fig-wort,* is called in Latin, *Scrophularia major*, *Galeopsis*, and *Ocymastrum*. It is a Plant two or three foot high, which grows in hedges, and other shady places. Its Leaf resembles

seembles a Nettle ; its Root is thick and knotty, like to the tumors of the Kings-evil, whence it hath its name. The whole Plant hath a stinking sinell. It contains much Salt and Oil, some Phlegm and Earth, and it is good to discuss Scrophulary Tumors, being laid upon them. It serves also to soften hard swellings, to cleanse Wounds and old Ulcers.

Plantane is called in Latin, *Plantago*, that is, *Plantane*, an excellent Plant. There be three kinds of it, distinguished by the number of Fibres or Nerves, which appear in them. The common *Plantane* hath Seven, and it is called *Plantago major*, or *Septinervea*. Its Leaves are large, its Flowers pale ; its Seed small and black ; and its Root is tufty. It grows every where, and is the best of them all. The second sort has Five Fibres, and therefore it is called, *Quinquenervea*, or, *Plantago aquatica*, because it grows in waters. Its Leaf is long and pointed. It has also the name of *Plantago media*. The *Plantane* which has Three Fibres, is called, *Trinervea*, or, *Plantago minor*. It also grows near waters, and has a small, and rough, or hairy Leaf. *Plantane* contains Oil, a little Salt, much Earth and Phlegm : This Salt is acid, and being mixed with the Oil, and a good quantity of the passive Principles, it is almost wholly absorbed by them ; and therefore the Plant is only a gentle Deterfive, but it is Astringent and refreshing, because of the Earth and Phlegm in it. It is used in all sorts of Fluxes, Hemorrhagies, and in inflammations of the Eyes.

Agrimony in Latin is called *Agrimonia* or *Eupatorium*, it is a Plant about a foot and a half in

in height, which grows in all Countries. Its Leaves are long, divided and hairy, or velvety; its Flowers small and of a Yellow colour; its Seed is slender, and wrapt up in a downy Skin. It contains a good quantity of Salt and Oil; and these active principles are mixed with much Earth and a little phlegm, which render the Plant deterlive, astringent in respect of the Stool, but aperitive by Urine. It is esteemed good in diseases of the Liver, and it stops a Flux.

Vervin. *Vervin*, in Latin, *Verbena*, or *Verbenaca*, *Hierobotane Mas*, *Columbaris* and *Herba Sacra*. It is a Plant which sends forth many stalks about the height of a foot and a half. Its Leaves are long, indented, and a little rough. Its Flowers are small, and of a bluish colour. Its Root is slender and fibrous. It grows in the high ways, and near unto walls; there be many kinds of it. It contains a good quantity of Salt and Oil. It is Cephalick, Vulnerary and desiccative. It is used in the diseases of the Breast, for the Stone, and Dysenteries. It is given to procure Milk to Nurses, in Pleurifies, and may be taken inwardly, or applied outwardly.

Worm-wood. *Wormwood*, in Latin, *Asinthium*, it is a Plant four foot high, sending forth many stalks, and branches freight and whitish. Its leaves are long, deeply cut, soft, having a strong Aromatick Smell, and a very bitter Taste. Its branches are surrounded, or garnish'd with a great quantity of small yellow grains, to which succeeds a slender Seed. Its root is thick, shredded into threads. It grows in Gardens, and is called, *Asinthium ponticum seu Romanum*, *seu vulgare*, to distinguish it from several other kinds of *Wormwood*. It contains

tains a sulphureous Spirit, or rather an exalted Oil, which is the cause of its Odour, much Salt, and a little phlegm. It is good to kill Worms in the Body, and to help Digestion. It is Vul-*Vertue.* nerary, Aperitive, and Hysterick.

Fennil, in Latin *Feniculum*; it grows every where, and there be two kinds of it. The First is, *Garden Fennil*, called, *Marathrum*; the other is wild, and is called, *Hippomarathrum*, because of its largeness. The Seed of *Fennil* is much used in Medicin, that of *Florence* is esteemed the best, because it is largest and best nourished. It expelleth Wind, and is Hysterick. *Fennil* contains much Salt, and an Oil, half exalted to a Spirit, a sufficient quantity of Earth and Phlegm. The Root is Aperitive, and the Leaves are good *Vertue.* to clear the Eyes, and to cleanse Wounds.

Saint Johnswort, in Latin *Hypericum*, *Androse-* *St. John's* *mum minus*, *Ascyron*, *Mille-fora*, or *Perforata*, because its Leaf is naturally pierced with many small holes. It grows every where; its Leaf is long and small; its Flower Yellow; its Seed slender and odoriferous: It contains Oil, Salt, and Earth in good quantity, but a little Phlegm; and it is Vulnerary, Hysterick, Aperitive, and *Vertue.* good for the Nerves.

Astrologe, or *Birthwort*, in Latin, *Aristolochia*, *Astrologe*, because it is good to bring away the after-birth in *or, Birth-* *Womens delivery*: It is also called *malum terra*, *wort.* because its fruit is like an Apple. There be four kinds of this Plant, the round, the long, the climbing, and the small and slender.

The first is called, *Aristolochia rotunda*, which sends forth many weak stalks about a foot high. *Aristolochia rotunda.* Its Leaves are round, soft, close to the stalks. Its

N n

Flowers

Flowers are of a dark purple colour, tending somewhat to black. Its Seeds are flat, thin, wrapt up in small long fruit, divided into six Cells. Its Root is round, brown without, and yellow within, very bitter, and disagreeable to the Taste. It grows in high ways, Fields, fat and moist Earth.

Aristolochia longa. The second is called, *Aristolochia longa*, which sendeth forth many long pliant stalks, about a foot and a half, spreading themselves towards the ground. Its Leaves are formed like a Scythe pointed and joined to the stalk by small twigs. Its Flower is much like that of the round *Birwort*, and is follow'd with a fruit like to small Pears, and contains a flat black Seed. Its Root is long and thick as the Arm of a Child, having colour and taste like that of the round: It grows in fields, in Vineyards, amongst Corn, and in hedges.

Clematitis Saracenica. The third is called, *Aristolochia, Clematitis seu Saracenica*: It sends forth stalks, streight, and much stronger than those of the other kind. Its height is about two foot. Its Leaves are like those of Ivy, wrinkled, and supported by long twigs. Its Flowers are long, and of a pale Yellow. Its Fruit are much grosser than those of the other kind, of an oval Figure, divided into six Cells full of flat Seeds. Its Root is slender, thready or fibrous and grey. It grows in Fields, Vineyards, Woods and hot places; There be several sorts of it.

Tennis, Pistolochia, Polyrrhizon. The fourth kind is called, *Aristolochia tenuis, seu Pistolochia, seu Polyrrhizon*; It sendeth forth many weak, slender stalks, which creep upon the ground: Its Leaves and Flowers are like those of the other kinds, but they are much smaller and

and paler: Its Fruit is like a small juicy Pear; filled with Seed, and its Root is very thin, fibrous, joined together like a Beard to a small Trunk. Its colour is Yellow; its Taste sharp and bitter; its Odour strong and agreeable: It grows in Vineyards, Woods, hot, dry and strong ground.

All these *Birthworts* contain much Oil and Salt, some Phlegm, and a little Earth.

They are Vulnerary, Deterfive, Hysterick, good to stop Gangreens, to attenuate Phlegm, and to help respiration. The two first kinds are used outwardly, the Roots of the two last are used in Remedies which are taken inwardly. Vertue.

Orpin, whose names in Latin are, *Telephium* *Orpin. vulgare*, *Fabaria*, *Faba inversa*, *crassula*, *Ace-tabulum alterum*, *Cotyledon alterum*, *Scrophularia media*, and *Anacampteros*: It is a Plant which sends forth several streight stalks about a foot high. Its Leaves are like those of *Purslane*, but longer and more juicy. Its Flower is white or yellowish. Its Root is glandulous or knotty. It grows in stony ground, and about walls. It contains much Phlegm and Oil, a little Salt and Earth.

It is Vulnerary, Astringent, Moistning, Heal-
ing, good for Ruptures, Dysenteries, and for
cleaning and taking out the Spots of the Skin. Vertue.

Fluellin, or *Speedwel*, is a Plant of which there
are two general sorts, the one Male, and the
other Female. There are also two kinds of the
Male, the one streight, the other crooked or
creeping: This last is most used, and particular-
ly in the composition of this Water. It is cal-
led in Latin, *Veronica Mas supina* & *vulgarissi-*

*Fluellin, or,
Speedwel.*

ma, seu Veronica Mas Serpens, seu Teucrium. It shooteth forth many stalks or branches that are slender, long, round, rough, and creeping on the ground. Its Leaves are long, toothed at the edge, hairy, and somewhat smaller than those of *Betony*: Its Flowers put forth into bluish Ears, and sometime white. Its Seed is thin, round, and blackish; its Root is fibrous. It grows in Vineyards amongst hedges, in sandy and uncultivated ground. It has a bitter and sharp Taste.

The Female is called in Latin, *Veronica femina, Betonica Pauli quorundam, Veronica minor, serpylli folia, Veronica pratensis, seu auricula maris prima in pratis, and Euphrasia Nobilis.* It sendeth forth many small slender stalks, creeping towards the ground, full of long Leaves like wild *Thyme*. Its Flowers are small, pale, or blue. Its Root is thin. It grows near the high ways, and in moist places.

Vertue.

These Plants contain much Salt and Oil: They are Incisive, Attenuating, Deterfive, Vulnerary, Sudorifick, good for the Ulcers of the Breast and Lungs, and for expelling Poison.

Little

Centaury. *Little Centaury,* is called in Latin, *Centaureum minus, or, Centaurea minor, or, Fel terra,* because it is very bitter. It is also called *Febrifuga,* because it is thought to cure Fevers.

It is a small Plant, little more than half a foot high; its Leaves are long like those of *Hypericum*, but somewhat larger: On the top it has several small branches, as it were, on which do grow red Flowers, which clasp one another. When they fall, there come in their places, some small heads, or Cloves, long, thin, full of a powder: Its Root is thin, dry, thready and insipid.

lipid. It grows in dry and sandy places. It contains much Salt, some Oil and Earth, and but little Phlegm.

It is Vulnerary, Deterfive, Desiccative, Ape-
ritive, good against the Scurvy, intermitting Fe-
vers, Worms, Madnefs, Obstructions of the
Terms, Gout, Sciatica and Jaundice.

Milfoil, in Latin, *Mille-folium vulgare album*, *Milfoil*.
Stratiotes terrestris, seu *Achillea*, seu *Militaris*.

It is a common Plant, which sendeth forth several stalks to the height of a foot, or a foot and an half, stiff, angular, hairy, red, and branched towards the top: Its Leaves resemble those of *Chamomel*, and by reason of their great number, give it the name of *Milfoil*: But they are more close, and disposed into two sides like a Feather. Its Smell is very agreeable, and its Taste a little sharp; Its Flowers are upon the top, small, white, and odoriferous. Its Root is fibrous and twiggy. It grows along the high ways, in Church-yards, and in dry places. It contains
much Salt and Oil. It is Astringent, Vulnerary, Dissolving, good to stop a Flux, Hemorrhages and Gonorrheas.

I will refer *Tabacco* to a particular Chapter
by it self.

Mouse-ear, in Latin, *Pilosella major repens* bir-
suta, or, *Auricula muris minor*. It is a Plant
whose Leaves are long, round towards the end,
covered with a white down, or some small hairs,
which gives it the name of *Pilosella*. They re-
semble the ears of a Rat; whence it hath the other
name of *Auricula Muris*. It lyeth close, as it
were, upon the ground, but somewhat raised in
the middle. The stalks are about half a foot high,

N n 3 furnished

furnished with long and streight Leaves, and do bear upon the top Flowers partly white, partly purple. Its Root is fibrous. It groweth in the Fields. It contains some essential Salt and Oil, a little Phlegm, and much Earth.

Virtus.

It is Astringent, Vulnerary, Healing, good for Ruptures, to stop Hemorrhagies, Dysenteries, and other Fluxes.

Mint.

Mint, in Latin, *Mentha*, is an Aromatick Plant, of which there be two general kinds, the *Garden Mint*, and the *Wild Mint*.

The *Garden Mint* is divided into three sorts. The first is called in Latin, *Mentha sativa crispa seu Balsamita*. It sendeth forth stalks of a dark red colour. Its Leaves are almost round. Its Flowers are reddish, and it is esteemed the best of all the kinds.

The second is called, *Mentha sativa acuta spicata*. It sendeth forth long Leaves, partly broad and partly narrow. Its Flowers are small and formed into an ear: Either of these *Mints* may be used in making of this Vulnerary water.

The third is called, *Mentha Saracenica*, *Mentha hortensis*, *Corymbifera major*, *Mentha Romana*, *Mentha Græca*, *Costus hortorum*, *Alisma*, *Balsamita*, and *Herba Sanctæ Mariæ*. Its Leaves resemble those of *Betony* toothed about. whitish. Its stalks have the height of a foot and an half, or two foot, and do bear in their tops, Flowers like Grapes.

Wild Mint, is also divided into three kinds. The first is called, *Menthastrum*, or *Mentha Callicina*. The second, *Mentha Aquatica*, or, *Sylvestrium*. The third, *Mentha Caltaria seu Nepeta*. All these *Mints* contain much exalted

Oil

Oil and volatile Salt, but little Phlegm or Earth.

They are good to comfort the Stomach, to *Vertue.* help Digestion, to expel Wind, to cure the Colick, to attenuate and discuss Humors, and to stop a Gangreen.

Hyssop, in Latin, *Hyssopus*, is a Plant which *Hyssop.* sendeth forth several square stalks, a little hairy, of a foot high, knotty, and full of branches. Its Leaves are long and narrow. Its Flowers have the form of an Ear of a bluish colour; its Root is the thickness of the little finger, long, hard, and fibrous. It grows in Gardens. It contains much volatile Salt and exalted Oil, a little Phlegm and Earth.

It is Vulnerary, Deterfive, Aperitive, and is *Vertue.* used in diseases of the Breast and Lungs, as in *Asthma's* and *Tubercles*.

Seeing the most part of these Plants, which compound this Water, are not very juicy, therefore it is proper to add the White-wine; for this liquor helps the Fermentation, and serves to loosen the saline and volatile sulphureous parts of the matter.

Care must be taken that the Fire be not very great during the distillation, lest the matter fix to the bottom of the Cucurbite, and give the water a burnt smell. When you have distilled the half of the liquor, put what remains in the Cucurbite into a Linen Cloth, and squeeze out the juice of it; then pour it back into the Cucurbite, and distil it. By this means you shall shun a burnt scent: But if the *Balneum Vaporis*, or *Balneum Mariæ* which is used, be large enough, the distillation may go on safely.

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If

If you dry the mass of Herbs which remains and make a *Lixivium* of its ashes, and thereafter draw out the Salt by evaporation, and then dissolve this Salt in the distilled water, it will give it a more deterfive and dissolving quality,

CHAP. XVIII.

Of Sugar.

What Sugar is.

Sugar is the essential Salt of a Reed or Cane that grows in many places, and especially in the Western Islands of *Madera*, and *Canary*. The Pulp in the Trunk of this Plant is taken and washed, and then steeped in hot water, this water is strained, and evaporated, and the Sugar remains at bottom; heretofore it was called *Mel arundinaceum*, or the Cane-honey, but since it has been called *Zucharum*, or *Saccharum*.

Cassonade.

The first elaboration that is given to Sugar, is to purifie it, by dissolving it in water, filtrating and evaporating the liquor, after which it is made up into Loaves, or else it is sent in Casks or Chelis, and is called *Cassonnade*, or *Castonnade*. There are of it the Red, the Brown, and the White Sugar, according as it has been more or less purified, it differs in colour. The name *Cassonnade* may have been derived from the Casks in which it is brought, called *Cass* by the Germans.

When the Sugar has been refined no more than above said, it is a little fat; now to refine it farther it is dissolved in Lime water, it is boiled, and the

The scum taken off; when it is sufficiently boiled, it is cast into molds of a Pyramidal form, which have a hole at bottom to let the more glutinous part run through, and separate.

It is still further refined by boiling it with the whites of Eggs in water, for the glutinous quality of the Whites of Eggs does help to receive and take away the impurities which might remain in the *Sugar*, and the boiling of it serving to drive them all to the sides of the Vessel in a scum, the liquor is passed through a cloth, and then evaporated to a due consistence.

Sugar-Candy is only a *Sugar* crystallized; the way to make it, is to boil refined *Sugar* in water to the consistence of a thick Syrup, it is then poured into pots, wherein little sticks have been laid in order; it is left in a still place some days without stirring, and you have the *Sugar-Candy* sticking to those sticks. *Red Sugar-Candy* is made after the same manner.

Sugar is good for infirmities of the Breast and Lungs, because it does attenuate and cut the phlegm which sometimes oppresses the Fibres of these parts, but you must use it as little as may be in hysterical cases, by reason that it raises vapours. *Red-Sugar* is sometimes mixed with detensive Clysters.

Its sweetness does proceed from an essential acid Salt mixed with some oily parts of which it consists, as I have already explicated in the Remarks upon *Oil of Antimony* prepared with *Sugar*.

The *Cassonnade*, or *Cask-sugar* makes a sweeter impression upon the Tongue than our finer *Sugar*, because it contains more viscous or fat parts, which do remain the longer upon the Nerve of the Tongue,

Tongue, and this makes us sometimes prefer the first, as to the use, before the other. And for the same reason the finer a Sugar is, the quicker it passes off the taste. *Sugar-Candy* is better for Rheums than common Sugar, because being harder it requires a longer time to melt in the mouth, and besides it keeps the Breast moister than the common Sugar.

Spirit of Sugar.

THIS Spirit is a mixture of the acid part of Sugar with the Flowers of *Sal Armoniack*. Powder and mix eight ounces of white Sugar-Candy with four ounces of *Sal Armoniack*, put this mixture into a glass, or earthen body, whose third only is thereby filled, fit a head to the body, and place it in a sand Furnace; joyn a Receiver to it, and lute well the junctures with a wet bladder, give it a small fire for an hour only to heat the Vessel, then increase it to the second degree, there will distil a liquor drop by drop, and towards the end there will rise white vapours into the head; increase your fire still more, until nothing more comes forth; let the vessels cool and unlute them: you will find in the Receiver seven ounces of a brown liquor, that has but an ill smell, and a little black Oil stuck to the sides, pour it all together in a glass body, and having fitted to it a Head and Receiver, and luted the joints, distil in sand six ounces of a very acid Spirit, that is clear and agreeable to the taste, and without any smell of Empyreum.

It

It is a good Aperitive against the Gravel, and the Droplie, it is good to stop *Diarrheas*, and Dysenteries with, it may be dropt into the Tincture of Roses, instead of other acid Spirits. Some do think it good for Diseases of the Breast; The Dose is eight or ten drops, or to an agreeable acidity in some proper liquor. *Dose.*

That which remains in the body after the rectification is a fetid Oil, which may be outwardly used to cleanse old Ulcers. *Oil of Sugar.*

Remarks.

The Spirit of common Sugar is made without addition of any thing in the preparation; it is an acid Spirit, but is not so strong, nor has so great virtues, as that which I have now described. It is thought good for Diseases of the Breast, by reason of the Sugar, which indeed is good for them, but so strong an acid is apt to give a Cough. *Spirit of common Sugar.*

The Body must be big enough, in order to give room to the Vapours to circulate in, as they do rise.

A very little Oil of Sugar can be drawn in this Operation; for that which remains after the rectification is not a pure Oil, but a remainder of the Spirit tinged with some drops of Oil, insomuch that it would be very hard to get one drachm of pure Oil.

CHAP.

CHAP. XIX.

Of Wine.

Muste.

WINE is nothing else but the *Muste*, or juice of ripe Grapes, whose Spirituous parts are set at liberty in the Fermentation. This *Wine* is more or less gross, according as it abounds more or less with *Tartar*.

Why Red-
wine is
stronger
than
White.

In the making of *White-wine*, the *Muste* of white Grapes is left to Ferment all alone; but *Claret* must Ferment with the *Feces* of the Grapes; whence it comes to pass that the Red is loaded with more *Tartar* than the White, and remains longer in the body after it is drunk. The wines of hot Countrys do commonly more abound with *Tartar* than others, by reason of the abundance of Salts which they attract from the earth. *Muscat*, and *Spanish Wines* do not endure a Fermentation, until good part of the Phlegm is evaporated, either by the heat of the Sun, or by fire; and this is the reason they become so glutinous as they do, almost like Syrup. Lastly, there may be made as many different *Wines*, as there can be different Fermentations to the *Muste*. Now let us consider what it is that happens in these Fermentations.

Muscat and
Spanish
Wine.

Muste
Anatomi-
zed.

Muste is a sweet liquor that sends no vapours to the head to Intoxicate, though one drinks never so much. If you distill it, there will rise first of all, good store of *Inspid water*, after that a fetid *Oil* with a few weak *Spirits*, which are nothing but

but an *Essential Salt* dissolved; and lastly there will remain a terrestrious mass, out of which may be drawn some quantity of fixt salt by making a *Lixivium*, as we draw other alkali salts; but among all these substances we find none of those Spirits that use to make *Brandy*, and yet nevertheless when *Muske* hath Fermented for some time, it turns into Wine, from whence you may draw a considerable quantity of inflammable spirits.

Now to explicate this effect you must know that *Muske* doth contain a great deal of *Essential Salt*; this Salt like a volatile, making an effort in the Fermentation to deliver it self from the oily parts with which it was before incumbred, does open and divide them, untill by its subtile and keen points it hath rarified them into Spirit; this effort of the Salt does cause the Ebullition which happens to wine, and which at the same time does help to purifie it; for it separates the grosser parts of the wine in form of a scum, of which some part does stick to, and petresce on the sides of the vessel, and another part precipitates to the bottom, the first is called *Tartar*, the last the *Lees* of wine. The Inflammable *Spirit of Wine* then is nothing but an Oil exalted by salts, and this is an indubitable proof of what I establish, that there was nothing but oil in the *Muske*, which was capable of taking fire: these same salts also being a little freed from the cover they were wrapt in, are they that change the wallowish sweetness of *Muske* into an agreeable Tartness, such as we perceive in our *French Wines*.

How Muske
turns into
Wine.

Spirit of
Wine.

It is likewise remarkable that a sufficient quantity of Phlegm is requisite for the better separation of the Salts in their Fermentation, and an Exal-

Why Muscat and Spanish Wine is Sweet.

Exaltation of the Oil; for otherwise several changes are apt to happen: for example, when *Muscat* and *Spanish wine* are made, a great deal of Phlegm are separated from them; for the *Muscate Grape* is left to dry in the Sun upon the Branches, before it is gathered to put into the press, and some part of the liquor of the *Muske*, with which *Spanish Wine* is made, is Evaporated before it is suffered to Ferment; which is the cause that the Salts not having liberty to ex-patiate, and to rarifie the Oil as much as they would do if they had room, do make but an imperfect Fermentation. The Oil being thus half exalted, hath still strength enough to hinder the Tartness of the salt, and therefore only tickling the Nerves of the tongue, makes us perceive in these liquors a sweet taste. And this is also the reason, why fewer Spirits are drawn from *Muscat* and *Spanish wines*, than from *French wines*; for whereas the Spirit of Wine doth consist in a rarified Oil, there must needs be fewer Spirits in those, than in *French wines*. But much more of a gross Oil is drawn by distillation from those half fermented Wines.

If on the contrary the *Muske* should be loaded with too much phlegm, as it happens often enough, there follows another imperfect Fermentation, because the Salts being too much weakened by it are not able sufficiently to cut and exalt the parts of Oil, whence it comes to pass that these Wines are subject to turn eager, or to sower: but they may be made good again by mixing them with the Lee which contains much Salt. The Wines of *Languedoc* and *Provence* being extremely loaded with *Tartar*, are grosser than the Wines of

of *Burgundy* and *Champaign*, because their Spirits are incumbered with abundance of Salt and Earth. Wherefore the goodness of Wine may be said to proceed from a convenient proportion of phlegm and *Tartar*.

It is objected to this last discourse, that the *Tartareous* part being in a natural way separated from the Wine, should in no wise diminish the quantity nor the strength of the Spirituous and inflammable part.

But when I asserted that the Spirits of divers Wines are extremely loaded with *Tartar*, I did not mean that *Tartar* which petrifies at the sides of the vessels, for that is at quiet, and does not hinder the Exaltation of Spirits; but I intended a *Tartar* that still remains mixt in the Wine after the Fermentation, and which according as it abounds more or less, does render the Wines more or less thick and gross. It is easie to see this *Tartar* I speak of, if you evaporate the aqueous part of Wine, for it will remain at bottom in form of Lees. Nevertheless there is no need of establishing two sorts of *Tartar* in one kind of Wine, for the former is only the more soluble part of the other.

Divers little Objections have likewise been made me on this subject, for want of duly examining what I have established. Wherefore I do not desire to enlarge in the relation of them, for I do aim as much as I can, to avoid Repetitions, as being good for nothing but to swell a Book and tire the Reader.

Wine diminishes the appetite, as saith *Hippocrates*, and the cause may be, because the Sulphureous Spirits it is charged with, do dull and oppress the Ferment of the Stomach, which by its irritation caused hunger.

Vinous

Objection.

Answer.

Wine diminishes the appetite.

*Vinous Li-
quors.*

Vinous liquors must be made of all Fruits, and many other things, by means of Fermentation, as from Apples, Pears, Honey and Hopps. In like manner Berries, Seeds, Leaves and Flowers, may be made to ferment: But because several of these things are naturally too dry to ferment easily, they must be wetted with water, after they are beaten; and to quicken their Fermentation, a little *Yeast* is to be added, and by this means liquors are made, whence burning Spirits may be drawn as well from *Wine*.

*Explication
of the Small
Pox.*

That which happens in the Fermentation of Wines, may serve very well to explicate many diseases, but especially the *Small Pox*, for it is very probable that in this disease the Blood does boil and ferment in the vessels much after the manner as *Wine* ferments in a vessel.

The little *Pustules* of the *Small Pox* are a *Tar* which is separated from the Blood to the Skin, after the same manner as the *Tartar* separates from the *Wine* to the sides of the vessel, and indeed they have the same effect as Salt in corroding the Skin.

Infants are more subject to this disease than elder Persons, because their Blood is more like to *Muske*, and consequently is more subject to ferment.

The *Small Pox* does usually happen but once in a man's life, just as *Muske* does ferment also but once.

Distilla-

Distillation of Wine into Brandy.

FILL with Wine half a large Copper body, cover it with its *Moor's head*, bordered with its *Refrigeratory*, and fit to it a *Receiver*; lute well the junctures with a wet Bladder, and distil with a gentle fire, about a quarter of the Liquor, or else until the Liquor which distils doth not burn; when fire is put to it, that which is in the Receiver is called Brandy, and in French, *Aqua vite*.

Remarks.

Brandy is a Spirit of Wine loaded with phlegm, that it hath carried with it in the distillation; these Spirits do always rise first, and so it is known that there remain no more in the Cucurbit, when the liquor that distils is no longer inflammable.

Brandy may be drawn from all sorts of Wines, but more of it may be drawn in some Countries than others. For example, The Wines that are made about *Orleans* and *Paris* do yield greater plenty of *Brandy* than many others which seem to be stronger; and the reason is, That those Wines which appear stronger, being loaded with a great deal of *Tartar*, have their Spirits as it were fixed, whereas the others containing but a convenient portion of this *Tartar*, do leave their Spirits at greater liberty.

When Wine has been drunk, there is made a separation of Spirits in the Body, much resembling that which is made by distillation: for the heat of

O o

the

the Bowels warming it, causes the spirituous Parts to spread on all sides through the Pores, and some part of them to mix with the Blood, and rarefie it, from whence it comes to rejoice the heart, and encrease the vigour of the whole Body; but because these Spirits do always tend upwards, the greatest part flies into the Brain, where it quickens its motion, and produces a certain gaiety of mind that is wont to furnish us with many excellent thoughts.

But now if Wine moderately taken is so profitable for the Functions of the Body, it likewise causes many mischiefs, when it is excessively used; for the spirituous Parts rising in great abundance do circulate in the Brain with so much celerity, that they soon confound the whole Oeconomy. And then the objects will appear double, and the walls of the place where one is, seem to have changed their ordinary situation.

This Confusion remains until the Spirits having some good time dissolved the phlegm, do in part condense with it, and in part spend through the Pores.

It likewise then happens, that a Man is prone to sleep, because the *Vitrua* being attenuated either by the Spirits of Wine, or by the phlegm they have drawn along with them, glides into the small passages of the Brain, and retards the Circulation of the Animal Spirits, by gluing them together; for after the same manner as the motion of the Spirits in the Brain does beget watchfulness, so their repose or condensation produces sleep. But I shall speak more amply of this subject hereafter, when I come to treat of the effects of *Opium*.

The

The sleep which is caused through excess of Wine doth usually remain until the Animal Spirits have rarefied this phlegm, and opened a free passage. Those who are intoxicated with Beer, Cider or some such like liquor, do remain in their Drunkenness a longer time, and sleep more after it, than those who are drunk with Wine, because the Spirit of these liquors, carrying along with it a viscous phlegm into the Brain, remains a longer time in the disengaging it self, and passing through the pores. Again it is the viscosity of this phlegm, which entring into the *Sinus* of the Brain, does cause so long a sleep, because it is so hard to rarefie.

I said, that some Wines, as *Spanish* and *Muscad* Wine, yield less Spirit than our common Wine; yet experience testifies that they intoxicate sooner than our *French* Wine does, when a large measure is taken: The reason is, That being thick and viscous, they take longer time to pass than others, and consequently the Spirit which they contain does ascend more slowly to the Brain: But the intoxication which they cause does more hurt, and continues longer than that which is caused by *French* Wine, for the same reason which I gave when speaking of *Cider* and *Beer*.

Those accidents that I have related do proceed from the immoderate use of Wine, are but the first, and the less grievous, though indeed they are but little to be desired; every body knows that a continuation of frequent debauches doth at last render a man dull and stupid, and this by reason the Spirits of Wine do not only trouble the Natural Spirits in their functions, and render them Phlegmatick, but likewise by rarifying them do ever carry off and lose some store of them.

O o 2

These

These Persons are likewise subject to a continual spitting, or else they are molested with defluxions, Catarrhs, and Gout, because the *Pituita* being rendred more liquid by the Spirits and phlegm of vinous liquors, is forced to descend through the Lymphatick vessels; but if there happens to be the least obstacle in these vessels, it takes its course into the Nerves, and falls upon all the parts of the Body. Lastly, when excess of Wine occasions falling into the Apoplexy, and Palsie, it is by reason the *Pituita* is rendred too liquid by the Spirits and Phlegm of Wine, and causes Obstructions in the Head, and hinders the natural course of the Spirits into the Nerves. Many other sad effects of Wine-debauches might be herein mentioned, but this digression is too long. Let us return to our Operation.

After the Wine hath been deprived of these Sulphureous Spirits, there remains in the Body a Tartareous Liquor which being exposed a good while to the Sun in a Cask without its stopple, turns into good Vinegar.

It may be some such thing happens in the Bodies of those who accustom to drink too much Wine; for whereas the volatile parts, which ascend to the Brain and Heart, by an agitation of the Spirits, do beget Joy; so on the contrary the Tartareous parts by fixing the humors about the *Hypochondria*, do cause by little and little that which is called Melancholy, which proceeds from an acid; whence it comes to pass that many men making a debauch upon Wine, with design to pass away their Melancholy, do afterwards find they have encreased it, when the debauch hath had its effect.

If you would by way of curiosity make an exact *Analysis* of Wine, you must take that which remains in the body after distillation of the *Brandy*, and distil off all the phlegm, there will remain a Matter like unto Rosine, put it into a Retort, and placing it in a Furnace, distil away more phlegm, in a small fire, until it begins to come sharp. Then fit a large Receiver to the Retort, and luting well the junctures, strengthen the fire by degrees, to drive forth acid Spirits, and a little fetid Oil, continue the fire until there comes no more.

The Oil is separated from the Spirit in a Tunnel lined with brown Paper; for the Spirit will pass through, and the Oil being too thick will remain. But it is here remarkable, that more of this Spirit and Oil is drawn from *Muske*, than Wine; which sufficiently proves the Remark I made before, touching the origine of the volatile Spirit of Wine; for seeing good store of the Oil of *Muske* hath contributed to the making volatile Spirit of Wine, there must needs remain but very little Oil in the liquor that *Brandy* is drawn from.

The acid Spirit of Wine, and the black Oil, are like to those of *Tartar*, which I shall describe anon. And an alkali Salt wholly resembling that of *Tartar* may be drawn by a *Lixivium* from the mass that remains in the Retort.

Spirit of Wine.

Spirit of Wine is the oily part of Wine refined by acid Salts.

Fill a large Bolt-head with a long neck, half full with *Brandy*, and fitting a Head and Receiver,

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lute close the junctures; set your Bolt-head upon a pot half filled with water, to distil in a vaporous Bath, the Spirit, which separates from the phlegm, and rises pure: continue this degree of fire until nothing more distils, thus you'll have a dephlegmated *Spirit of Wine* in the very first distillation.

Virtue.

It serves for a *Menstruum* to a great many things in Chymistry; half a spoonful of it is given to Apoplectical, and Lethargical persons, to make them come to themselves; likewise their Wrists, Breast, and Face are rubbed with it. 'Tis a good Remedy for Burnings, if applied so soon as they happen; and it is good for cold pains, for the Pailie, Contusions, and other Maladies, wherein it is requisite to discuss, and to open the pores.

Remarks.

Common way of making the Spirit of Wine.

The usual way of making *Spirit of Wine*, is by distilling *Brandy* in a Limbeck so many times over until it becomes pure; and to do this, about half the *Brandy* is drawn by distillation, and the phlegm that remains at bottom is useless. Again, half the Spirit which was distilled is a-new drawn off, and the phlegm thrown away; these Rectifications are continued, until you find by firing a spoonful of the Spirit, that every drop burns, and there remains not the least Phlegm; but because this Operation is very tedious, and it is a hard matter thus to get a *Spirit of Wine* wholly free from Phlegm, even after nine or ten times repeating these distillations, let the fire be never so small; Artists have invented a long Machine, which they call the *Serpent*, by reason of the circumvolutions which it makes. It is fitted to the

Distillation of the Spirit of Wine by the Serpent.

Cucurbit

Cucurbit containing the *Brandy*, and the top made like a Tunnel receives the Head, to which a Receiver is fitted, and the junctures well luted, and the vessel placed in a small fire, the *Spirits of Wine* do rise by this gentle heat, but the phlegm being too heavy cannot ascend so high, so that thus a *Spirit of Wine* deprived of its phlegm is had the very first time. But because this Machine is hard to carry into the Country, and other places where one would desire to make *Spirit of Wine*, and besides that it is subject to loosen in the joints, thro' the violence of the Spirits; I have thought that the way I delivered for making *Spirit of Wine* was more commodious; for provided you have but a Matraass and a Head, it will be an easie matter to draw as good *Spirit of Wine* as that by the *Serpent*, and there's no need to fear the Spirits breaking any way out of the vessel, if you do but lute well the junctures as I have said.

The Matraass must have a very long neck, that no phlegm may be able to rise into the Receiver.

The vaporous Bath is sifter than any other to perform this Operation in, because a most moderate heat is requisite to raise up the Spirits all alone; now the vapour of water warms very insensibly. You must continue the same degree of fire, until there comes nothing more.

Some Persons do endeavour to reject the method that I have described for drawing *Spirit of Wine*, because, say they, a long time is required to draw a little *Spirit*, and by reason of the difficulty they conceive in procuring such vessels well made, at *Paris*, and much more so in the Country.

But it is likely these Gentlemen do blame this method because they never tried it; for if they

had but taken the pains to make *Experiment* of it, they would have found that with two or three of these vessels, they might have drawn as much *Spirit of Wine*, as they could be able to do with their great Machine; and that this *Spirit* is not liable to the impression which might be communicated to it from *Copper* or *Tin* vessels. As for the difficulty that there is pretended of getting such glass vessels, there is none at all that I know of, but only for such as will not take the pains to visit the Glass-houses, for there they would find enough for their turn; and though I use a great many of them in my *Courses of Chymistry*, I never was to seek for any yet. But suppose there were none to be found ready made, methinks they might as easily bespeak them, and have them made at the Glass-houses, as well as bespeak those grand *Copper* or *Tin* Machines, that are commonly used. I know that such as are better pleased with making a fair shew, than with the effects of things, and who measure the goodness of an Operation by the trouble it gives one, and by the greatness of Vessels and Furnaces, will find here but little to their satisfaction. But I am very little concerned at such mens exceptions, I never endeavoured to follow their Track. My design is simply to facilitate the means of working in *Chymistry*, and to take away, as much as lies in my power, those things which render it mysterious and dark.

Verme.

Spirit of Wine is good for Lethargical, and Apoplectical persons, because it puts the Spirits into a greater motion than they were in before. Now because according to all appearance these Diseases are caused by Obstructions which hinder the course of the Spirits into the Brain, this Spirit serves to give

give them a new vigour, to dissolve and rarefie these Tartareous Viscosities which shut up their passage. It likewise discusses Tumors and Defluxions, because it not only opens the pores, and gives vent to the subtler part of the humor to perspire, but likewise dissolves and rarefies the grosser part, so as to render it fit to circulate with the Blood.

The *Spirit of Wine* is excellent for Burnings, provided it be used so soon as they happen; for then it opens a passage for the igneous particles to come out at; and if there should remain any within the part, it unites with them as it uses to do when mixed with an Acid.

Spirit of Wine Tartarised.

THIS Preparation is a *Spirit of Wine* that has carried with it some portion of *Salt of Tartar*.

Put a pound of *Salt of Tartar* into a long glass-body; pour upon it four pounds of *Spirit of Wine* prepared as I said before: place your vessel in Sand, and cover it with a Head, to which fit a Receiver, lute well the junctures with a wet Bladder, and give it a gradual fire, which continue until three parts of the *Spirit of Wine* are risen; then remove the fire, and keep this Spirit in a Viol well stoppt; it hath the same vertues as the other, but is more subtile. It is proper also for Obstructions. The Dose is from half a drachm to two in some proper liquor.

The liquor that remains in the body may be evaporated, and a *Salt of Tartar* got as good as before.

Remarks.

Remarks.

This Operation is only a Rectification of the *Spirit of Wine*, to render it more subtile than it was before; because the *Salt of Tartar* becomes impregnated with the phlegmatick parts, and hinders them from rising.

The *Spirit of Wine* doth likewise volatilize, and carry along with it some portion of the *Salt of Tartar*, which gives it a very agreeable smell, and renders it a good Remedy for Obstructions.

A sign, that the *Spirit of Wine* has carried along with it some of the *Salt of Tartar*, is this: If you dry gently the *Salt of Tartar* that remains in the Body, and weigh it, you'll find it diminished an ounce and a half.

You may again put this *Spirit of Wine Tartarized* to half a pound of more *Salt of Tartar*, and distil it as before: but I have found that it is never a-whit the better for it.

This way of *Tartarizing Spirit of Wine* is the very best and shortest of all that have been invented, whether you desire to make it pure, or to impregnate it with *Salt of Tartar*; and I may venture to say, That all the many long and tedious descriptions that have been given of this Operation, have been only invented to cast a dust into the eyes of *Novices*; for it is easie for any to observe, who give themselves a little to examine things, that after all their long turnings and windings, and circumstances to no purpose, the *Spirit of Wine* is not so well *Tartarized*, as by the plain method that I have described.

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Queen of Hungary's Water.

THIS Operation is a *Spirit of Wine* impregnated with the more essential part of *Rosemary Flowers*.

Fill a glass or earthen Cucurbite half full with *Rosemary Flowers*, gathered when they are at their best; pour upon it *Spirit of Wine* sufficient to infuse the *Flowers* in; set your Cucurbite in a *Bal-neum*, and joyning its Head, and Receiver, lute close the junctures, and give it a digesting fire for three days, after which unlute them, and pour into the Cucurbite that which may have been distilled. Refit your Alembick, and encrease the fire strong enough to make the liquor distil, so as one drop may immediately follow another; and when you shall have drawn about two thirds of it, and put out the fire, let the vessels cool, and unlute them, you'll find in the Receiver a very good *Water of the Queen of Hungary*, keep it in a Viol well stoppt. It is good in the *Pallie*, *Lethargy*, *Vertue.*
Apoplexy and *Hysterical Maladies*: The Dose is *Dose.*
 from one drachm to two. It is likewise used outwardly for *Burnings*, *Tumors*, *Cold Pains*, *Contusions*, *Pallie*, and all other occasions, wherein it is requisite to revive the *Spirits*. Ladies do use to mix half an ounce of it with six ounces of *Lily-water*, or *Bean-flower water*, and wash their Face with it to clear their complexion.

Remarks.

Remarks.

You must distil this water in a Fire that is strong enough, for otherwise the *Spirit of Wine* would rise alone, or else draw a long with it but very little *Essence*, as I have observed in the working upon it.

The *Oil*, or *Essence of Rosemary*, may be made as the *Oil of Cinnamon*, and some drops of it mixed in the *Spirit of Wine*, and hereby you have a *Queen of Hungary's water* made upon the spot.

The *Water* of the *Queen of Hungary*, produces the same effects as the *Spirit of Wine*, but with more force, and sometimes gives ease to the Tooch-ach, being snuff'd at the Nose, or applied to the Gums with a little Cotton.

Some thinking to Criticize a little, do say, it is altogether useless to digest *Rosemary Flowers* with *Spirit of Wine*, because their substance being of a very volatile nature, it easily dissolves in the Spirit without any digestion.

But this circumstance is very necessary, if we desire to have a *Water* well impregnated with the *Essence* of the *Flowers*: for although there is a volatile substance in *Rosemary*, yet a good part of the *Oil*, in which consists principally the Smell, is involved in the other Principles, and cannot be well rarefied, mixed, and exalted, but only by a digestion: And thus we have a very good effect from it.

There may be also a good *Queen of Hungary's Water* made after the following manner.

Another
Queen of
Hungary's
Water.

Take two pounds of *Rosemary Flowers*, the *Leaves of Rosemary*, the crops of *Thyme*, *Savory*, *Lavender*,

Lavender, Costmary, Sage, Marjoram, of each four ounces; beat them together, and put them into a large glass or earthen Cucurbit: add to them the Salts of *Armoniack* and *Tartar* in powder, of each an ounce, and pour upon all six pints of the *Spirit of Wine*: Then stop the Cucurbit with its Head; give it a Receiver, lute the junctures closely, and proceed to digestion and distillation, as in the former Queen of *Hungary's* water. You shall have a water of a very subtile odour, and much stronger than the other.

The *Sal Armoniack* and the Salt of *Tartar*, being moistned by the humidity of the Flowers, do send forth an oily volatile Spirit, which mixes in the water, and renders it more penetrating and effectual than common Queen of *Hungary's* water, against Vapours, and such diseases where there is need of rowling up the Spirits with force.

CHAP. XX.*Of Vinegar.*

WINES, like all other liquors that use to ferment, do grow sour by the dissolution of their Tartar in a second Fermentation: This dissolution is commonly made, when upon the Wines going to decay, some of the more subtile Spirits are lost; for the Tartar taking their place fixes the rest of the Spirits which remain in the Wine, so that they

they can act no longer. This fixation is the cause that when the Wine turns sour, very little quantity of it is diminished, and very little Tartar is found in the vessels wherein *Vinegar* is made.

To the end that Wine may quickly sour, you must set the Vessel that contains it in some hot place, and mix the Lees from time to time; for this Tartar will easily dissolve, when heat comes to act upon it.

Objection. Perhaps it will be objected that Wine deprived of Tartar and Lees does grow sour, when kept a long time in a Vessel, without any dissolution of Tartar.

Answer. But we must consider that Wine, let it be as clear and pure as may be, does always retain the more saline and subtile part of Tartar, which exalts and easily smells, when by Fermentation it gets the predominancy of the Sulphureous Spirits, which held it as it were involved: and thus clear wine sours alone, but it does not sour so fast, and the Vinegar is not so strong, as when it is made upon Tartar.

Furthermore if we consider the Principles that Wine consists of, we shall find, that neither the Oil, nor Earth, nor Water, are capable of yielding any acidity, and that nothing but the Salt is able to give it. Now it cannot be doubted but that the Salt of Wine is in the Tartar.

Different Fermentations. It may be added here, That the Air to which Wines are exposed, by leaving the vessel open, when they would have them turn into Vinegar, does likewise communicate a little of its acidity to the Wines, by exciting and rarefying the acid of Tartar.

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I cannot pass this Chapter, without shewing to the curious Reader, the divers changes which the several Fermentations work upon the juice of the Grape, how its acids preserve themselves under the divers Vehicles in which they are wrapt up, and in what time they are destroyed.

The Grape at first, when it is very Green, is *The first* sharp and Stiptick, because its acid is shut up in Grape something of Earth, which has not been yet *Stiptick* sufficiently digested by the heat of the Sun.

As the Grape groweth, its juice is less Stiptick *Verjuice* and more sharp, which is called *Verjuice*: Then there is a small Fermentation, which has in some manner, rarefied and softened the fibres of the Fruit, by which means the acids are a little more freed from the Earth, and so do prick the Tongue more than they did before.

The Grape, when it is ripe, leaves its sour- *Ripe Grapes* ness and turns sweet, because the Fermentation *sweet, and* it has received, extends the oily parts which did *the reason* not before appear, tho' they were actually in the *why.* fruit: Now they cover and enclose the acid points, and hinder them to prick the Nerves of the Tongue so much as before: However, they contribute to give a taste to the Grape; for if they did not, the oily parts would pass slightly upon the Tongue, and give a very insipid taste. An acid is very requisite for a Vehicle, to make the Oil penetrate and appear sweet, as I have observed elsewhere.

We may still consider many other degrees of Fermentation in the Grape; for as it ripens it acquires more sweetness, because the Oil does still better mix with the acids.

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The juice of the Grape, while it continues in the Fruit, never ferments sufficiently to become Wine, let it be never so long in it: But as soon as it is squeezed out, by breaking the fibres of the Fruit, and changing the disposition of its parts, then there follows a violent Fermentation, which rarefies the Oil, gives liberty to the acid Salt, and causes that agreeable pricking of the Tongue which Wine makes.

Wine.

Vinegar
and its
destruction.

Lastly, There happens a Fermentation, which fixes and destroys, in some measure, the sulphureous *Spirit of Wine*, and sets the acids at full liberty, as we see in *Vinegar*: These acids continue a long time; but being moved and continually agitated by the Sulphurs which intangled them, they at last evaporate into Air; and so the strongest *Vinegar* by length of time becomes almost insipid.

Distillation of Vinegar.

Spirit of
Vinegar.
Virtue.

Dose.

PUT six quarts of strong *Vinegar* into an earthen Pan; evaporate in a *Balneum* about a quart, which is the phlegmatick part; and pour that which remains into a glass or earthen Cucurbit, and distil it in a strong sand-heat, until there remains at bottom nothing but a substance like Honey; keep this *Vinegar* well stopp'd, many do call it *Spirit of Vinegar*.

Its principal use is to dissolve or precipitate bodies. It is sometimes mixed in Cordial Potions, to resist putrefaction; The Dose is half a spoonful: It is mixed with water, and this *Oxycrate* is used

used to stop Hemorrhagies, taken inwardly, and to assuage Inflammations, applied outwardly.

Neither *Vinegar*, nor any other acids are proper for melancholy Persons, because they fix the humors too much: They also turn those, who take much of them, Lean; for they give too great consistency to the blood, and do hinder the Chyle from distributing it self sufficiently through the body to give nourishment.

Remarks.

The Spirit of *Vinegar* consisting in an acid, essential or tartareous Salt, is very different from the Spirit of *Wine*, which is sulphureous and very volatile: The methods also of drawing them are different; for in the distillation of *Wine*, the phlegm arises after the Spirit, because it is more heavy: But in the distillation of *Vinegar*, the phlegmatick part comes first, because it is higher than the acid Salt, which composes the liquor that is called the Spirit, so what arises last is strongest.

The common method of distilling *Vinegar* is, to separate what arises first, to throw it away as an empty phlegm, and only to keep what is last distilled: But I have observed, that the phlegm of *Vinegar* does not separate it self as that of *Vinegar* many other acid liquors; for that which is distilled first is almost as sharp as that which comes afterwards, how small soever you make the fire in the beginning. Wherefore, I never dephlegmate *Vinegar*, but only use the strongest I can get. Furthermore *Vinegar* is not distilled to dephlegmate it, but only to deprive it of its
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gross tartareous part, to make it clear as common Water, that it may not bestow any tincture upon the ingredients which are dissolved in it.

The reason why we cannot dephlegmate *Vinegar* by distillation is, because it contains many sulphureous Spirits, which preserve always some degree of motion and volatility, do exalt the acids, and render them as light as the phlegm.

Common *Vinegar* keeps its strength a longer time than the distilled, because it contains a more terrestrious Salt, that doth not volatilize so easily. And for this reason, you should rather chuse to use *Vinegar* newly distilled, than that which hath been kept a good while. All acids do prove Cordial, and good against malignity of humors, when it is caused by too great a commotion, because it fixes and coagulates them, moderating their motion. Thus in places where the Air is corrupted, and Pestilential, *Vinegar* is a good preservative; you may every morning take half a spoonful of it Fast-
ing; but in diseases which proceed from a Tartareous humor, as the Hypochondriack melancholy, it is rather hurtful than good, because it fixes the humors the more.

Some having dried and calcin'd the sweet extract that remains at the bottom of the Cucurbit, after the distillation of *Vinegar*, and having by Solution, Filtration, and Coagulation, separated from it an alkali fixt Salt, much like to that which is drawn from Tartar, they mix it with *Spirit of Vinegar*, and distil and cohobate it divers times, until, say they, the Spirit has carried off all the Salt, and then will needs have it called *Spirit of Vinegar Alkalized*, or *Radical Spirit of Vinegar*, and

Vinegar
good against
Pestilential
Air.

Spirit of
Vinegar
Alkalized.

and they affirm that this being much more pure, and entirely united with its proper Salt, is much the more powerful in dissolving Metals. But the distilled *Vinegar* is so far from becoming the stronger through this Preparation, that I can demonstrate that it breaks and loses the greatest part of its edges in contending with the alkali Salt, with which it is mixt, for it is the property of this Salt to sweeten acids.

Neither is it necessary to believe that by distillations is so drawn the alkali Salt of *Vinegar*, for it remains fixt at bottom of the Retort with the acids it is impregnated with; so that this same *Spirit of Vinegar* to which so many great names and uses have been appropriated, is properly the more phlegmatick part of distilled *Vinegar*.

CHAP. XXI.

Of Tartar.

ANY gross or terrestrious matter, that sticks to the sides of the vessel, when separated from its liquor by the means of fermentation is called *Tartar*. But the *Tartar* I am going to speak of here, is that of *Wine*. It is found sticking to Casks like a very hard stone, sometimes white, and sometimes red, according to the colour of the Wine it comes from.

White *Tartar* is to be prefer'd before red, because it is purer, and contains less earth; both

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one and t'other are had in greater abundance in hot Countries, such as *Languedoc* and *Provence*, than many other Climates; but the best white *Tartar* of all is brought out of *Germany*; it must be heavy, White and Crystalline.

The Lees of Wine are likewise a liquified *Tartar*, they are burned, and the Ashes that are made of them are called *Cineres Clavellari*, in English, *Gravelled ashes*.

Gravelled
ashes.

Crystals of Tartar.

THIS Operation is a *Tartar* purified, and coagulated in form of Crystals.

Boil in a great deal of water what quantity of white *Tartar* you please, until it be all dissolved; pass the liquor hot through *Hippocrates's Sleeve*, into an earthen vessel, and evaporate about half of it: set the vessel in a cool place two or three days, and you'll find the little *Crystals* on the sides, which you are to separate; evaporate again half the liquor that remains, and remit the vessel to the Cellar as before, there will shoot out new *Crystals*: continue doing thus, until you have gotten all your *Tartar*, dry the *Crystals* in the Sun, and keep them for use.

Virtue.

Dose.

The *Crystal of Tartar* is Purgative, and Aperitive; it is good for Hydropical, and Asthmatical persons, and for Tertian and Quartan Agues. The Dose is from half a drachm to three drachms in Broth, or some other proper liquor.

Remarks.

Remarks.

This Operation is, to speak properly, nothing but a purification of the more Terrestrious parts of *Tartar*. You must observe to boil it in an earthen vessel, rather than any metallick one, because it would be apt to take some Tincture from it.

A *Skin* that swims a-top after evaporation of some part of the liquor was heretofore carefully taken off, and there was thought to be some difference between it, and the *Cryстал* of *Tartar*. But this *Cream* or *Skin* is only a part of the *Tartar* that begins to coagulate, and so it is the very same thing in substance with the *Cryстал*. Cream of
Tartar.

You must not imagine that the *Cryсталs* of *Tartar* do much differ from common *Tartar*, for they differ from it only in the containing a little less earth, but all the five principles may be drawn from the *Cryсталs*, as from common *Tartar*.

When you would take the *Cryсталs* in substance you must make them into Pills, or into a *Bolus*, with some liquid substance; or else you may boil them in some liquor, but you must take the liquor very hot, otherwise the *Cryсталs* will fall to the bottom of the cup you drink out of.

If you should boil these *Cryсталs* in common water, or in broth, and then let it stand to be cold, they will return into the same form they were in before, both at the bottom, and on the sides of the vessel, but the liquor will remain a little sharp, through the solution of some part of the Salt of *Tartar* into it.

I see no reason so much to wonder, as some do, why *Tartar* will not dissolve in cold water; for al-

though it does contain a great deal of Salt, this Salt is involved in Earth and Oil, which must needs hinder the dissolution, and there is no need of having recourse, for an explication of this, to a proportionable Union of volatile Salts and acids.

Soluble Tartar.

THIS Preparation is a *Cream of Tartar*, reduced into the form of a Salt.

Powder and mix together eight ounces of *Crystals of Tartar*, and four ounces of the fixt Salt of Tartar, put this mixture into a glazed earthen pot, and pouring upon it three pints of common water, boil the matter gently for half an hour, then letting it cool, filtrate and evaporate the liquor until it is dry, and there will remain at bottom, eleven ounces six drachms of a white Salt; keep it in a Viol, it is both a good *Aperitive*, and *Laxative*, it is good for *Cachexies*, *Dropsies*, and all diseases that proceed from *Obstructions*. The Dose is from ten grains to two scruples in Broth, or some proper liquor. It is called a *Vegetable Salt*.

Virtue.

Dose.

Vegetable Salt.

Remarks.

This Operation is nothing but a dissolution that the Salt of Tartar has made of *Cream of Tartar*, so that it can dissolve in cold water, which it could not do alone; the *Cream of Tartar* also being an acid insinuates into the pores of the alkali Salt, and sweetens it.

If you boil Cream of Tartar in water, and put into it some Salt of Tartar, there will happen an effervescency between them, but if you mix these two ingredients together in cold water, there will be no effervescency; the reason of which is, that the acid Spirits of Cream of Tartar being involved in other principles, can have no active power to open the Alkali, unless they be actuated by fire.

Use to filter the dissolution, in order to separate some terrestrious part of the Cream of Tartar, which could not dissolve: This Salt comes near in vertue to Tartar vitriolated.

The Evaporation must be made in an earthen Vessel by a fire of sand. We should use a flat Vessel glazed, that resists the fire, for otherwise the earth being very porous, the Salt would penetrate the sides, and there would be much of it lost. Metallick vessels are not proper here, because they give some tincture to the Salt, nor can it be made so white in them as in those of Earth. If earthen Vessels be wanting, take glass ones. At the end of the evaporation, take care that the fire be not too strong; for seeing the *Cream of Tartar*, which enters into the Salt is composed of five principles, the matter will readily fix to the bottom of the vessel and burn. To shun this inconvenience, it is necessary to stir it with a stick until it be quite dried.

We may also Crystallize the soluble *Tartar* by evaporating only two thirds of the humidity, and removing the earthen vessel from the fire: And when it is cold, Salt will be found Crystallized in it. Pour the liquor, that is in it, by inclination into another earthen Vessel, and evaporate again a part of it as before, to crystallize

all the Salt. Dry this Salt at the Sun, or by some other gentle heat. The last Crystals will not be so white as the first.

The Crystals which come from soluble *Tartar* are not very distinct, or well shaped; they have not so much edge as the Cream of *Tartar*; because in the ebullition the alkali of the Salt of *Tartar* has somewhat broken them.

Chalybeated, or Martial Crystals of Tartar.

THIS Preparation is a Crystal of *Tartar* impregnated with the more soluble part of Iron.

Powder and mix a pound of good white *Tartar*, and three ounces of *Rust of Iron*, boil this mixture in an Iron pot with five or six quarts of water, for half an hour, or so much time as is requisite to dissolve the *Tartar*, pass the liquor hot through a warm cloth, then let it settle in an Iron or earthen pot ten or twelve hours, it will shoot into brown Crystals, at the sides and bottom of the pot, pour off the liquor by inclination, and gather the Crystals; then evaporate about half the liquor in the same pot, let the remainder settle, and take out the Crystals as before; continue these evaporations and Crystallizations, until you have drawn all your *Tartar*, dry the Crystals in the Sun, and so keep them.

Vertue. They are a good Remedy for Obstructions of the Liver, Mesentery, Spleen; they are given in Cachexies, and for Melancholy, and the Quartan Ague; The Dose is from fifteen grains to two Scruples in Broth, or some other liquor proper to the distemper.

Remarks.

Remarks.

This Preparation is boil'd but little, that the Tartar may dissolve only the more saline part of Iron; the liquor is made to pass through a cloth, to free it from the impurities of the Tartar and Iron which could not dissolve; but you must pass it very hot, for if it were a little cool, the Tartar would coagulate in the Cloth, and so none of the liquor would pass.

Instead of CrySTALLIZING the dissolved Tartar, you may evaporate all the Liquor, and so obtain a brown powder, which has the same vertues as the Crystals.

When you would exhibite this chalybeated Crystal of Tartar, you must make it just boil in the liquor you give it in, for otherwise it will not dissolve, and you must be sure to give it as hot as they can take it, for fear it should CrySTALLIZE at the bottom of the Cup.

Soluble Tartar Chalybeated.

THIS Operation is a *Soluble Tartar*, impregnated with the *saline* part of *Iron*.

Put into an earthen pan, or glass vessel four ounces of *Soluble Tartar*, and sixteen ounces of *Tincture of Mars* prepared according to the description that I have given, set the vessel in sand, and with a small fire evaporate the liquor, until there remains a black powder, shut it in a Viol well stoppt, and keep it, you'll have eight ounces.

This

Vertue.

Dose.

This *Martial Tartar* has the same vertues as the *Tincture of Tartar*, it is good to remove all Obstructions, wherefore it is very properly used in Cachexies, Dropsies, retention of the *Menses*, in Nephritick Colicks, and in difficulties of Urine: The Dose is from ten grains to half a drachm, in Broth, or some proper liquor, or else made into Lozenges.

Remarks.

This Preparation of Chalybeate, or *Martial Tartar* is not only more convenient for use than the former, (in that it dissolves, or mixes in a cold liquor) but has much more vertue in it, for the *Tincture of Mars* contains only the more fine part of *Tartar*.

Tartar Emetick.

THIS Operation is the Cream of *Tartar*, charged with a sulphureous part of the *Liver of Antimony*.

Powder and mix together eight ounces of the Cream of *Tartar*; and two ounces of the *Liver of Antimony*, put the mixture into an earthen pot glazed, pour upon it three pints of common Water; cover the pot, and set it upon the fire, that the liquor may boil for eight or nine hours; take care to stir it at the bottom frequently with a wooden Spatule, and to add new hot water as the first is boiled away: After this, strain the liquor boiling hot through a woollen Cloth, or a linen one doubled; and having cleansed the pot,

pot, pour the liquor again into it, and evaporate about half the humidity. Take the pot from the fire, and leave it to cool without stirring it: Pour off the liquor by inclination, and you will find Crystals. Proceed again to evaporate about three fourths of the liquor: And when it is cooled you will have new Crystals. Continue the evaporations and crystallizations until you have got all your *Emetick Tartar*. Dry the Crystals, and keep them; there will be four ounces and a half of them.

It is a gentle Vomitive. The Dose is from *Vertue* three to ten grains, in a proper liquor, or mixt *Dose* in some Conserve.

Remarks.

It is fit to powder and mix together for some time in a Mortar, the two ingredients, to begin the communication of the *Emetick* quality of *Antimony* to the Cream of *Tartar*.

There must not be poured in too great a quantity of Water, that the Cream of *Tartar* may not be too much weakened, but that as it dissolves, it may mix with the sulphureous and saline parts of the *Antimony*. Some remainder of fixt *Salt-peter*, which is in the *Liver* of *Antimony* mixeth with the Cream of *Tartar*, and makes it more soluble. It acts only by vertue of its acid Salt.

The liquor while it is boiling hot must be strained, otherwise nothing will pass but the water; for the Cream of *Tartar* will congeal, and either precipitate to the bottom of the pot, or stop in the passage. If instead of the woolen Cloth, or double linen one, you use brown Paper, supported

supported by a linen cloth, your *Tartar Emetick* shall be whiter, but there will be less of it, and therefore in this case you must put into the same pot the matter which lies upon the brown Paper, adding about a pint and an half of water, and boiling it for a quarter of an hour: Then filtrate the water while it boils through new Paper, that the Cream of *Tartar Emetick* may be strained over again. These dissolutions and filtrations may be repeated until all the *Tartar* be got, and afterwards mingle them all together for evaporating the humidity, and crystallizing them, as I have said.

The first crystallization does almost contain all the *Tartar*, and therefore they do not evaporate much liquor the second time.

Instead of the Crystallizations you may evaporate all the humidity, and you shall have a powder which shall be as good as the Crystals.

This *Emetick* works gently; for the *Tartar* does fix in some manner, and tempers the great activity of the Sulphur of *Antimony*, being a Corrective to it.

You must not think, that all the *Liver of Antimony* is dissolved with the Cream of *Tartar*, there remains much of it in the filter, which is thrown away as useless, it being only the more fixed part, for the sulphureous part is dissolved.

Soluble Emetick Tartar.

THIS Preparation is a *Soluble Tartar* impregnated with some portion of *Liver of Antimony*, which renders it *Emetick*.

Put

Put into a glass vessel four ounces of Crystals of Tartar powdered; pour upon it Spirit of Urine, until it be two fingers above the matter, there will happen a small ebullition, because the Cream of Tartar will dissolve in the Spirit of Urine; when the dissolution is finished, add to it an ounce of the Liver of Antimony finely powdered, and eight or ten ounces of water; boil it all in a sand-heat seven or eight hours, and take care to put more hot water into the vessel, as the liquor consumes; after that filtrate, and evaporate gently in sand all the liquor, and there will remain three ounces of a grayish powder drawing towards white, keep it in a Viol well stoppt. It is an Eme-
Vertue.
 tick that works with little violence: The Dose is
Dose.
 from four to fifteen grains in Broth.

Remarks.

The Ebullition which happens in this Operation, proceeds from the Cream of Tartar's meeting with the volatile and alkali Salt of Urine; for the acid of Tartar piercing the Salt of Urine divides its parts, and gives vent to igneous bodies which were contained in it, and which now finding themselves free do break forth in great haste.

Volatile Spirit of Sal Armoniack may be used instead of that of Urine; but then there will be no sensible Ebullition, the reason of which is, because the salt of this Spirit is not an Alkali so open as the Spirit of Urine, by reason of some impression it has of the acid Sal Armoniack, with which it was mixt; insomuch that the Crystals of Tartar whose acid is not separated from the Earth, has points too gross, and too unactive to insinuate
 into

into the pores of this Salt, and separates its parts so easily as those of the Salt that is contained in *Spirit of Urine*, whose pores are bigger.

Some part of the *Liver of Antimony* dissolves in the boiling, and gives the *Emetick* quality to the powder. It is a very gentle Vomit, because the *Tartar* fixes, and in some measure hinders the activity of the Sulphurs of *Antimony*.

If instead of making the aforesaid evaporation, you should take the vessel off the fire, when there is but two thirds of the liquor consumed, and let it settle without stirring it, in four and twenty hours the soluble *Tartar*, will crystallize at the bottom, and on the sides, but it will be never a whit the better.

Crystallization.

When you would make this crystallization you must use a flat vessel, let it be of earth, that the Crystals may display themselves the better. The liquor is to be decanted, and the Crystals to be taken and dried. The evaporation and crystallizations are to be continued, until you have obtained all your Salt.

Another Soluble Tartar Emetick.

Another sort of *Soluble Emetick Tartar* may be made by boiling in water an ounce of the *Liver of Antimony* powdered with four ounces of *Soluble Tartar*, for seven or eight hours, then upon filtering and evaporating the liquor, there will remain a gray powder of the same vertues as the other, and to be given in the same Dose.

But these *Soluble Emetick Tartars* are not so strong as the first *Tartar Emetick* which I have described, by reason of the alkali Salts that are mixed with them: For these Salts sweeten, or they do blunt very much the points of the acid *Salt of Antimony*, and do hinder it from pricking the

the fibres of the stomach so violently, as it would do, if it were not mixed with it; Therefore the Dose of the *Emetick soluble Tartar* should be larger than that of the first *Emetick Tartar*, where there is no alkali, and which is not soluble.

Heretofore I used the *glass of Antimony* for making the *Tartar Emetick*, but I have found since, that the *Liver of Antimony* makes it more vomitive: The reason of this is, because there being more saline Sulphur in the *Liver of Antimony* than in the *glass*, therefore the *Tartar* receives more of it from the one than the other. Indeed the *glass of Antimony* is a stronger vomitive than the *Liver* if you take the substance of it by it self; but the *Emetick* quality may be better had from the *Liver*, because the other is deprived by Calcination of the most soluble Sulphur.

Distillation of Tartar.

THIS Operation is a separation of the phlegm, the Spirit, and the Oil of *Tartar*.

Fill two thirds of a Retort with *Tartar* grossly powdered, place your Retort in a Reverberatory Furnace, and fitting to it a large capacious Receiver, begin the distillation with a very small fire for three hours only to warm the Retort, and drive out the phlegm drop by drop; throw away this insipid water, and refitting the Receiver, lute close the joints, encrease the fire by little and little, and you'll see Spirits fill the Receiver with Clouds; continue it that the Oil may likewise come forth; then when there will come no more,

Oil of Tar-
tar.

Vertues.

Spirit of
Tartar.

Vertue.

Dose.

more, let the vessels cool, and unlute them; pour that which is in the Receiver into a Tunnel lined with brown Paper, that the Spirit may filtrate, and separate from the thick black Oil that remains in the filter: keep this Oil in a Viol, it is good to smell to in Hyfterical Vapours: it would be good to rub Paralytical parts with, and for cold pains, but by reason of its abominable smell, it is not used.

Pour the Spirit into a glass Cucurbit, and rectifie it by distilling it in sand, it is good against the Palsie, Asthma, and Scurvy, it works by Urine, and by Sweat. It is used in Hyfterical maladies, and for the Epilepsie: the Dose is from one drachm to three in some appropriate liquor.

You will find in the Retort a black mass, from which a Salt may be drawn, as I shall shew hereafter.

Remarks.

If you have used three pounds of *Tartar* of sixteen ounces to the pound in this Operation, you will draw four ounces of phlegm, eight ounces of Spirit, and three ounces of Oil; the black mass which remains in the Retort after distillation, will weigh two pounds, or two and thirty ounces, and you will draw from that mass twelve ounces of salt.

Almost all Authors who have spoke of *Tartar* have asserted, That two sorts of Spirits could be drawn from it by distillation, the one very volatile, the other fixt and acid; wherefore after all had mixed confusedly in the Receiver, they separated the Oil, and added some alkali, such as Coral, or Crabs-eyes, to that which remained, then

then they poured it into a Cucurbit, and distilled about half the liquor, which they pretended to be a volatile Spirit; for the acid Spirit remained absorb'd by the alkali, with the phlegm in the bottom of the body.

But having vowed never to be led by any Authority which is not founded upon experience, I have examined the nature of *Tartar* as strictly as possible, and after a great many distillations of it, I could never perceive this volatile Spirit, which hath been obtruded upon us; all that I could ever find is this, that *Tartar* contains good store of essential Salt, which renders it acid, and that this Salt coming forth by distillation, and mixing with phlegm, doth make all the Spirit that can be drawn from *Tartar*. So that the *Spirit of Tartar* according to the description of these men is only the more phlegmatick part of the liquor, that is to say, the most deprived of this essential Salt, because almost all of it doth adhere unto the alkali body of Coral, or Crabs-eyes, which were added to it. But according to the way I have set down, the Spirit may be drawn as pure as may be, because I do not leave it to mix with the phlegm, which comes out first.

If we do rectifie the Spirit, it is done to purifie it from some terrestrious parts, which it might have carried along with it in the distillation.

Some thinking to do better than those who rectifie Spirit of *Tartar* on alkali matters, do instead of those alkalies use Biscuit powdered, but they attain their end never the better, for the Biscuit does sweeten the acid Spirit of *Tartar* as much as Coral, or Crabs-eyes.

A very volatile and alkali Spirit is drawn from the Lees of Wine: I shall speak of it in the Chapter of the volatile Salt of *Tartar*, and perhaps it is this very *Spirit* that *Paracelsus* and *Van Helmont* do boast so much of, and which has occasioned many Authors to write, that the *Tartar* does contain a most volatile Spirit.

Fixt Salt of Tartar, and its liquor, called Oil per Deliquium.

Break the Retort which served you for distillation of *Tartar*, and take the black mass you find in it; Calcine it until it becomes white, then put it into a great deal of hot water, and make a *Lixivium*, filtrate it, and pour it into a glass, or earthen vessel, evaporate in a sand-heat all the water, and there will remain a white Salt, which is called the *Alkali Salt of Tartar*.

Virtue.

This Salt is Aperitive, it is used for to draw forth the Tincture of Vegetables, and is given for Obstructions; The Dose is from ten to thirty drops in Broth, or Laxative Infusions.

Dose.

If you expose for some days in a Cellar this Salt of *Tartar* in a wide glass vessel, it will dissolve into a liquor that is improperly called *Oil of Tartar per Deliquium*.

Oil of Tartar per Deliquium.

It is used for Tettars, and to discuss Tumors; the Ladies do mix it in Lilly-water to clear their complexion, and hands.

Remarks.

Remarks.

In these two last Operations I have given you the means of obtaining all that can be got from *Tartar*; but those who have no need of the Spirit or Oil, and would only desire the Salt, may bruise the crude *Tartar*, and wrapping it up in Paper may calcine it until it turns into a white mass; after which they may draw the salt by a *Lixivium*, as I said before.

*An easie
method for
calcining
Tartar in a
little time.*

I do commonly draw this way four ounces of very white, and well purified salt of *Tartar*, from each pound of *red Tartar*; a little more may be drawn from *white Tartar*, but it is no better than the other.

Quantity

I have observed that when water is thrown upon the mass of *Tartar* newly calcined, it heats, much like unslack'd *Lime*, when wetted; the reason of which is the same that I have given, to explicate the ebullition of *Quick-lime* in water: all the difference is this, That *Tartar* calcined containing a great deal of Salt, does more easily imbibe water than *Quick-lime*.

Some do calcine Salt of *Tartar* with a little Sulphur, to hinder it from dissolving so easily by the air, and to render it the whiter; but this is no good practice, because the acid Spirit of Sulphur destroys some part of the alkali; and this does come to happen, by reason that the pores of this Salt by being thus calcined are not so open as they were, and the air therefore cannot so easily melt it. If you would make Salt of *Tartar*, and other alkali fixt Salts very white indeed, you must calcine them all alone in a great fire, until they be-

*Sulphur not
to be added
in the calci-
nation of
Tartar.*

Q q 2

some

Purification
of the
Salt of
Tartar.

come white, and then purifie them by dissolution, Filtration and Coagulation. As for their proneness to dissolve, this is natural to alkali Salts, and cannot be taken from them, but by destroying their nature.

Nor can I approve the addition of any quantity of *Nitre* to the Calcination of *Tartar*, as some do, because the volatile parts of *Nitre* being exalted, the fixt do remain, and by their acidity do diminish the vertue of Salt of *Tartar*.

Although the Salt of *Tartar* be tolerably white after the first purification, yet if you do calcine three score and four ounces of it, and filtrate it as I have said, you will draw still abundance of earthy matter: and if in curiosity you should dry this earth, you would find three ounces and a half of it.

Alkali salts are aperitive, in that they dissolve those slimy humors which caused Obstructions; and it is for the same reason that Salt of *Tartar* does correct *Senna*, and hinders it from griping, for the substance of *Senna* being viscous, this does rarefie it, and make it work the quicker; it may also serve to dissolve some viscous phlegm that sticks in the guts, which as it is going off, causes griping pains.

The liquor or Oil made *per Deliquium* is only a Salt of *Tartar* dissolved by the moisture of the Cellar. If you would make it quickly, you must dissolve the Salt of *Tartar* in as much Rain water well filtrated, as is needful to turn it into a liquor. It may be used like the former, it cures Tettars, and discusses Tumors, because being an Alkali it sweetens the keen Salts which fomented these distempers.

When

When Salt of *Tartar*, or its liquor is dissolved in water newly distilled from some green plant, the water will turn green, and the greener the plant is from which the water was distilled, this Salt does make the water so much the greener. *Salt of Tartar makes some distilled waters green.* The water of Night-shade turns greener with it than Balm-water, Balm-water greener than Eye-bright-water, and so of the rest. The reason of this effect proceeds from this, That the alkali Salt of *Tartar* does rarefie, and make appear many little parts of the Plant, which did rise with the water in the distillation, and did not till then appear. But the water must be sure to be distilled with a fire sufficiently great, for if it should have been distilled in a *Balneum*, or such like heat, there would not appear the least shew of green, though an alkali Salt were mixed with it.

Cherry-water, *Rose-water* and many other distilled waters of fruits or flowers, do give no colour, by the addition of Salt of *Tartar*.

Tincture of Salt of Tartar.

THIS Operation is an exaltation of some parts of *Salt of Tartar* in Spirit of Wine.

Melt in a good Crucible twenty ounces of *Salt of Tartar* in a great fire, and when it is in Fusion, cover it with a Tile, and put coals round it; blow about it so, as to raise a greater heat, than if you were to melt Gold; continue this degree of fire about six hours, or until your *Salt of Tartar* is of a red marble colour, which you may know by thrusting the end of a *Spatula* into the Crucible, for when it is drawn out, you may look upon a

Q 9 3

little

little matter that is stuck to it; then take out the Crucible with a pair of tongs and turn it upside down into a warm mortar, the matter will coagulate in a little time, powder it presently, and put it into a matraass warmed before-hand; pour upon it *Spirit of Wine tartarized*, until it swims four fingers above the matter: stop the matraass with another to make a double-vessel, lute the junctures close with a wet bladder, set your matraass in Sand, and heat it with a gradual fire, to make the *Spirit of Wine* boil seven or eight hours, during which time it will assume a red colour. After that let the vessels cool, and unlute them; separate by inclination this most fragrant *Tincture*, and keep it in a Viol well stoppt.

You may pour more *Spirit of Wine* on the remaining *Salt of Tartar*, and proceed as before, as long as it will draw out any *Tincture*.

Vertue.

Dose.

The *Tincture* of the *Salt of Tartar* is an excellent Aperitive, it purifies the blood, and resists malignity of humors. It is used in the Scurvy, The Dose is from ten to thirty drops in some convenient liquor.

Remarks.

You must place the Crucible in the Furnace upon a Tile, for fear lest the wind which comes through the doors of the Ash-hole, and fire-room, might be apt to cool the bottom, and hinder the Fusion of the Salt.

The *Salt of Tartar* having been a good while melted in the Crucible, does flame when thrown upon lighted coals, as easily as *Salt-peter* does. This effect proceeds only from this, that the fire

has

has attenuated and volatilized the parts of this fixt Salt, so as to render them fit to exalt with the sulphur of Coals.

Many have writ that it is sufficient to calcine the *Salt of Tartar* two hours in a violent fire, or until the *Salt of Tartar* becomes bluish; but after having tried several times to make the *Tincture* according to this description, I could never be able to do it; it is true the *Spirit of Wine* will be a little Tinctured, but it comes not near that which is necessary to call it the *Tincture of Salt of Tartar*; for it should be red like Wine, and to make it so, it is requisite to calcine it as I have said, and good store of it should be put into the Crucible, because it diminishes exceedingly. You must likewise take care to use *Spirit of Wine well rectified*, for if there should be any phlegm in it, it would not turn red.

This *Tincture* doth not proceed from a fixt sulphur contained in the *Salt of Tartar*, as many have pretended; it is only an exaltation of this Salt in *Spirit of Wine*; for if by way of curiosity you should distil this *Tincture*, you would recover only a *Spirit of Wine*; and yet nevertheless there will remain at bottom but a small quantity of *Salt of Tartar* with its usual whiteness; which shews sufficiently that this colour did only proceed from the exact mixture of the *Spirit of Wine* with the *Salt of Tartar*, seeing upon their separation the colour disappears.

The *Tincture* of the *Salt of Tartar* loses its red colour as it grows old, by reason that the more subtile part of the *Spirit of Wine* is lost through the pores of the glass, and there remains only a Spirit which has not strength enough to keep the *Salt of Tartar* in its exalted condition.

Q q 4

Magistry

*Magistery of Tartar, or, Tartarum
Vitriolatum.*

THIS Operation is a *Salt of Tartar* impregnated with the acidity of *Spirit of Vitriol*.

Put into a glass body what quantity you please of *Oil of Tartar* made *per Deliquium*, pour upon it by little and little rectified *Spirit of Vitriol*, there will be a great effervescency: continue to drop more in, till there's no further ebullition; then place your Cucurbit in Sand, and evaporate the Spirit with a little fire, there will remain a very white Salt, keep it in a Viol well stoppt.

Virtue.

It is a good Aperitive, and is also a little Purgative; it is given in hypochondriacal cases, in Quartans, King's-evil, and all other diseases wherein it is necessary to open Obstructions, and to work by Urine. The Dose is from ten to thirty grains in some proper liquor.

Dose.

Remarks.

Tartarum Vitriolatum may be made with the *Salt of Tartar* as well as with the *Oil*; the Ebullition proceeds from this, that the acid of *Vitriol* piercing the alkali *Salt of Tartar*, doth violently separate its parts, and gives vent to igneous Bodies which were there imprisoned; and this effervescency comes to pass as often as an alkali meets with an acid, and remains until the acid can find nothing more to encounter in the alkali Salt. Then there follows a *Coagulum* at the bottom of the vessel, because the acid and alkali clasping together,

ther, do lose their motion, and by their united weight do precipitate to the bottom. And this causes the liquor to be much less acrimonious than the *Oil of Tartar* was before, though at least an equal quantity of *Spirit of Vitriol* was mixed with it. You must evaporate it gently, and especially toward the end, for fear the acid should rise withal.

This Salt is whiter than common *Salt of Tartar*, as having been subtilized by acids, after the same manner as we see several other white things encrease in their colour, as they are beaten into a fine powder.

If you do use two ounces of *Salt of Tartar* in this Operation, you'll draw two ounces and a half of *Tartarum Vitriolatum*. This augmentation comes from the more heavy and strong part of the *Vitriol*, for that which is evaporated is very phlegmatick.

You may here use the *rectified Oil of Vitriol* instead of the *Spirit*, and then the less is requir'd, because it is a stronger acid, but the *Tartarum Vitriolatum* will not be so white, as when *Spirit of Vitriol* is used, by reason of some *Tincture* that always remains with the *Oil of Vitriol*, rectifie it as much as you please.

Though some have written, That if *Tartarum Vitriolatum* were put into a Retort, and distilled, one might draw *Spirit of Vitriol* as good as it was at first, nevertheless it is certain that it will not be so strong a *Spirit*; for it has lost the most subtile part of its acidity, by encountering with the alkali, which may be easily judged both by the taste, and the effects.

If by way of curiosity you would search a little narrowly into this Operation, and observe what happens

happens during the ebullition of the acid and the alkali, you would find that a great many little dashes of water do fly about, especially if the vessel is not plac'd too low, and you hold a lighted Candle near it, for they will be apt to put it out. This effect can have no other cause than the violent separation of the parts of the alkali by the acid, which makes the watry part of this liquor to sparkle upwards, being on all sides violently driven.

If you use *Oil of Vitriol*, the ebullition is the greater, and the heat the more considerable, because its acid being stronger, it separates the parts of the alkali body more easily.

Now considering the ebullition which happens between acid and alkali, I have the less opinion of a method that some do follow, which is to bathe a little the bodies that are to be embalm'd, with *Spirit of Salt*, and then to put *Salt of Tartar* into the embalming powder; for it is very likely, that this *Spirit of Salt*, which is an acid, by mixing with the alkali salt of *Tartar*, may produce a Fermentation which may stir up the remaining humidity of the Carcass, and make it to mix with the Ingredients of the powder, and so instead of preserving the dead body, we have reason to fear lest this Fermentation should rather hasten a dissolution of its parts.

Acids do sometimes dissolve and rarefie, and at other times coagulate and precipitate, as may be seen by the Operations which have been described, these different actions do seem very strange, for it is hard to conceive how one and the same liquor should produce contrary effects; but I'll give you an explication of this *Phænomenon*, which because

it is built upon experience, may perhaps meet with some approbation.

An acid proves always dissolvent, when good store of it is poured upon the matter that is to be dissolved; but it makes a *Coagulum* as often, when being in too small a quantity, its points are fixed in the pores of the matter, and have not power enough to get out; and this is plainly perceived, when *Spirit of Vitriol* is poured upon the liquor of *Salt of Tartar*; for if you should mix but so much as is requisite to penetrate the Salt, the acids do remain sheathed in it, and bear it down, whence a Coagulation and Precipitation happens; but if now so much more, or a greater quantity of *Spirit of Vitriol*, should be still added to the liquor, the *Coagulum* will disappear, by reason that the little bodies which being gathered together maintained their part against the acid, and hindered its motion, will be then scattered and dissolved by the acid, that is now grown the stronger.

The same thing may be remarked in all other bodies which can be dissolved by acids; for if you take a little of any of those, and pour a little acid upon it, there is made a great effervescency, and after that a *Coagulum*; but if you add more acid, the matter will all dissolve.

An acid can likewise precipitate what an alkali hath dissolved, as we see in the Operation of the Magistery of Sulphur, and this because the acid having dissolved and separated the parts of the alkali makes it let go its hold, and the body precipitates by its own weight.

When Milk coagulates by the means of an acid, it is because it contains a great deal of Cheese, into which the acid enters, and losing its motion weighs

weighs it down; whence it comes to pass that the *Coagulum* which is made with a weak acid, precipitates much less than that which is made with a greater quantity of acid; but if you should in curiosity pour a great deal of acid upon the precipitated *Coagulum*, you would find it dissolve by degrees.

Almost all fermentations are only dissolutions by acids, either natural or foreign. Thus the fermentation of Wine happens, as we said, from the acids dissolving the oily parts of the *Muske*.

The fermentation of Dough, and other matters of the same nature does proceed from this, that the natural salts having been put into motion by trituration or some other cause do rarefie and dissolve, as much as they can, whatsoever resists their motion; but because these acid salts do exert their activity by little and little, and do meet with much resistance, the solution is made slowly, and the division of some parts is with difficulty enough. And this is that which causes the matter to swell as it does, and to take up greater room than it had before.

Leaven does encrease the Fermentation in Dough, because it self being a paste, whereof the salts are become free to act by means of a long Fermentation, these salts do easily join with those of the other paste, or dough, and do help them to rarefie and dissolve the whole.

The same may be likewise said of other acid matters which cause a Fermentation.

But when the acids have rarefied the matter as much as they are able, they lose their motion in it, and then the matter coagulates, that is to say, returns into the same extension as before.

There

There is still one effect of acids, which seems different from those I have now spoken of, that they do preserve certain bodies which are put into them, as salt keeps or preserves meat. Thus when young Cucumbers, Samphire, or Capers are steeped in Vinegar, there is no fermentation with them, and consequently no corruption.

The reason of which is, That the parts of Cucumbers and other like things being very viscous and sluggish, the acids do insinuate to dissolve them, but they have not there their motion free enough to make their jostles, and to divide the parts minutely, so that the acids of the Vinegar do only fix in the pores of these matters, and coagulate in them.

It is this coagulation which hinders the Cucumbers from corrupting, for these acids do shut their pores, and serve for so many little pegs, wherewith to sustain their parts firm and quiet. Sea-salt which is an acid does preserve meat, and many other matters, for the same reason. I have already spoken of that in my Remarks upon the Principles.

The Coagulation then which acids do cause may justly be said to be an imperfect dissolution of Bodies, and I could here relate a great many other examples to prove what I have asserted. But I shall content my self with those already said. And now let us see whether this discourse can furnish us with any thing that illustrates the digestion of Aliments in the Stomach.

Most of our modern Philosophers have not spared the notion of acid, when they have endeavoured to explicate digestion, they have conceived the membranes of the Stomach, to be all impregnated

nated with it, and many of them not contented with this liquor alone have brought some more of it from the Spleen and *Pancreas*: but if all these acids were really in the Stomach, the aliments would not escape coagulating, and consequently an indigestion, as uses to happen, after taking too many acids at meals; for conceive never so great a quantity of them, either there would not be enough to dissolve the Aliments, or else the Membranes of the Stomach would be attenuated and concocted too, as well as that which they contain, which nevertheless doth not happen in the natural temper of the body.

There is no need of seeking after these imaginary acids to cause digestion; the spittle which mixes with the Aliments as they receive their first Trituration between the Teeth, will furnish us with enough to actuate the Fermentation in the Stomach; there is but little acid requisite to set the parts in motion, but when once they are moved, they do contain enough Salts and Spirits of the same nature, which being quickned by the heat of this *viscus* will break all their Chains, and find a vent out, whence does infallibly follow an attenuation of the Aliment into a chylous substance.

Objection.

It will be said, without doubt, that the irritation in the Stomach, which is called *Hunger*, cannot be produced by any thing but an acid, which finding no more Aliments to work upon, uses to act upon the membranes themselves. But I think I shall explicate this irritation better, according to my own opinion, than that of these men; for I may with reason enough say, That the spittle finding the stomach empty of all nourishment, ferments

alone,

alone, and creates this irritation, seeing that spittle, as every body must grant, is loaded with a Salt; but as for them, they must make an acid to come from the membranes, which nevertheless doth not irritate them, but only when it meets with nothing else in the Stomach to exercise upon, which is a thing hard enough to comprehend.

I know very well that some of them to avoid this difficulty will say, that the acid is generated in the stomach from the remainder of that which is eaten, which continuing some time in the stomach produces a Leaven after the same manner as Dough; but then they must explain to me what the Ferment did consist of, which served to digest the first Aliments that the Infant took.

Another Objection may be made to what I have said touching digestion; it is, That whereas I have maintained that acids do dissolve when they abound, and coagulate when they are but few in a great deal of matter, it should happen that Spittle should then be apter to coagulate the Aliments in the stomach, and cause indigestion, than would a greater quantity of acids: for it seems, according to my discourse, the more acids are found in a matter, the more liable it must be to dissolve.

To resolve this difficulty, which seems to be very considerable, we must observe that the natural acids of Aliments taken into the stomach, are sufficient to rarefie and dissolve those bodies which hinder their motion, when it has been begun by Mastication, or by some salt of the spittle, which serves as a Leaven to them, much after the same manner as the salts of meal do rarefie the Paste, when they have been actuated before by Tritura-

Trituration and Leaven together; but now if there happens to be too much acid in the Aliments that are taken into the stomach, they will have the same effects as Cucumbers and those other things I mentioned, which are preserved in Vinegar. The acids will indeed endeavour to cut in pieces what stands in their way, but having to do with parts too viscous and heavy, they will soon lose all their activity, and fix by their quantity, and their gravity the natural salt of these aliments, as Vinegar fixes that of Cucumbers; for when the acids do shut the pores of the matter, and keep them firm and quiet, the natural salt cannot exalt so as to cause any Fermentation or digestion.

The reason then why a small portion of acids will cause digestion in the stomach, and a greater quantity will hinder it, is that the small quantity will joyn with the natural salt of the Aliments, and have its operation without shutting the pores of the matter: whereas a great store of acids will quite fill the pores of this matter, and hinder the motion of the natural salt; for it is not enough that there be a great many acids, to cause such a dissolution, these acids must have room to move in, and to make their jostles.

Thus these effects do make nothing against what I have asserted concerning acids, for a greater quantity of them will always have more disposition, and tendency to a dissolution; but if this great quantity does coagulate divers things, it is only by accident, and through the disposition of the matter into which the acid points have entred.

What I have here established concerning acids may serve very much to explicate the nature of Fevers, and their principal symptoms.

First,

First of all every body must grant, that when there are Obstructions in our bodies, the obstructed matter does ferment and fowr, as Dough, Wine, and several other things grow fowr by being stale.

This matter by Fermenting sends saline or acid vapours into the mass of blood, which do cause divers alterations in it, according to their quantity, and quality, for these acids are commonly mixt with sulphurs, which are a kind of Vehicle to the acids, and are more or less corrupted, according as the matter whence they are derived has sojourned more or less in the obstructed part.

Now if these acid vapours are carried into the vessels, but only in such a quantity as is fit to make a kind of Leaven, they will then rarefie the blood too much; and whereas they by consequence do encrease its motion and heat, they do cause that which we call a Fever; this Fever must remain as long as the Ferment continues in the blood, and according as there comes a new supply of matter in place of that which nature has thrown off.

But if a greater quantity of acids should rise all of a sudden from out of the Obstructions, then there must needs happen a kind of *Coagulation*, for these acids thus abounding, and fixing the grosser part of the blood, do partly lose their motion, and quiet the ebullition of the blood by fixing its parts.

It is this kind of Congelation which causes those cold shiverings, which are felt, before the hot fit begins; for as the heat is derived from the motion of the Spirits, the cold is produced from the cessation of their motion.

The trembling and shivering, called in Latin *horror*, which happens at the same time, and

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which

which is sometimes so very strong, that it makes the bed shake, is a kind of Convulsion, caused by the same acids, which prick the inward membranes of the vessels: For though the points of the acids be absorb'd by the ramous parts of the blood, yet there is still such a quantity as is sufficient to fix upon the internal coats of the vessels, and to prick them in that manner.

The cold fit continues until the Spirits have by their activity rarefied this Congelation; for the Spirits being continually supplied with additional forces do make violent assaults until they have made their way free.

The *Coagulum* being dissolved, the blood should seem to circulate as it did before, but because the matter of the *Coagulum* is converted into a Leaven, this Leaven makes the blood to boil, and so causes a Fever; this Fever continues until the blood is freed from all this Ferment, either by Transpiration, or by Urine.

Now to conceive how this *Coagulum* may be converted into a Leaven, we must consider that the Spirits of the blood have lost most of their acidity in dissolving this *Coagulum*, and that there remains but only acidity enough to produce a fermentation.

Nevertheless you must not think I mean by this Congelation now spoken of, a *Coagulum* altogether like to that in Milk, or to that which happens, when an acid liquor is syringed into the Veins of an Animal, for these Congelations are too strong, and there would then happen the same thing, or very near the same as does to the Animal, who soon afterwards falls into Convulsions, and dies, because the course of the Spirits and blood would

would be intirely stoppt, and they would never be able to break through so great an obstacle: But I do understand here that the blood is made thicker than it was, and has not so free a motion as it had before, which is enough to cause such cold fits.

Now it remains for me to explicate how it comes to pass that Fevers have their returns regularly by fits.

The matter that makes the obstructions which I have laid down for the Fundamental cause of Fevers, begins not to send forth its vapours, nor to disperse its acid salt into the blood in order to cause a Fever, until it has got together a certain quantity in the obstructed vessels, and then it is probable that there is a new discharge of the matter.

This discharge or eruption of Feverish matter must happen at set times, so long as the Obstruction lasts, because the humors which circulate to the obstructed parts, and there stop, are always in an equal quickness and an equal quantity.

Now because in a Tertian, the vessels wherein the obstruction happens, do acquire in two days a sufficient repletion of matter to produce the Eruption and Fermentation I have spoken of, the Fits do come to operate every second day.

But because in a Quartan the humors are more tenacious and heavy, and flow with less expedition, the Fermentation and eruption must needs be slower, and consequently the fits more distant the one from the other.

The Quotidian Ague is caused by a *Saline Pituita* which is naturally fluid enough to make the matter ferment in less time, wherefore it is that the fits do return every day.

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We may reason concerning the other kinds of Fevers upon the same principle, and explicate all the accidents that happen, but I have no design to enlarge my self further upon this subject, I should think it would be too great a digression, and a book should rather be made on purpose, to express all the circumstances which might be deduced from it.

Volatile Salt of Tartar.

THIS Operation is the Salt of the Lees of Wine, volatilized by fermentation.

Dry the Lees of Wine with a gentle fire, and fill with them two thirds of a large earthen, or glass Retort, place this Retort in a Reverberatory Furnace, and fitting to it a large Receiver, give a small fire to it to heat the Retort by degrees, and to drive forth an insipid phlegm; when vapours begin to rise, you must take out the phlegm, and luting carefully the junctures of your vessels, quicken the fire by little and little, until you find the Receiver filled with white clouds; continue it in this condition, and when you perceive the Receiver to cool, raise the fire to the utmost extremity, and continue it so, until there rise no more vapours. When the vessels are cold, unlute the Receiver, and shaking it about to make the volatile Salt which sticks to it fall to the bottom, pour it all into a Bolt-head; fit to it a Head with a small Receiver; lute well the junctures, and placing it in sand, give a little fire under it, and the volatile Salt will rise, and stick to the head, and the top of the Bolt-head; take off your

your head, and set on another in its place: gather your salt, and stop it up quickly, for it easily dissolves into a liquor; continue the fire, and take care to gather the Salt according as you see it appear; but when there rises no more Salt, a liquor will distil, of which you must draw about three ounces, and then put out the fire.

This Salt is in great request for to purifie the blood, by Sweat or Urine: it may be given in the Palsie, Apoplexy, Epilepsie, Quartan and Tertian Agues, and to open Obstructions; The Dose is from six grains to fifteen in some proper liquor.

The distilled liquor is a volatile Salt that is risen with the phlegm; it is called the volatile Spirit of Tartar, and has the same vertues as the Salt; its Dose is from eight to four and twenty drops.

After this same manner the volatile Salt of Beans, Soot, and divers Fruits and Seeds may be prepared.

Remarks.

The Lees of Wine being incomparably more fermented than the Tartar which is found in the sides of vessels, we need not wonder if its Salt is more volatile.

This Salt is sublimed in a Bolt-head, to the end the phlegm, which is too heavy to rise easily so high, may not mix with it; but it is extraordinary hard to keep this Salt dry, it easily humects and dissolves into a liquor, wherefore it were much better to draw it in a Spirit, and less of the volatile part would be lost, being detained by the phlegm.

Rectificati-
on of the
volatile
Salt of
Tartar.

Nevertheless because there are several persons who are as well pleased with the sight of things, as their effects, this liquefied Salt might then be mixt with a sufficient quantity of calcined Bones powdered, to make thereof a PASTE, which might be made into little Pellets, to be put into a Bolt-head, and fitting to it a Blind-head, this Salt may be sublimed or rectified as before, and this pure Salt must be kept in Vials well stopd.

The difficulty there is in keeping this volatile Salt dry, as well as that of other Vegetables, does proceed from this, that only the more essential part is volatilized, for there remains much fixt Salt with the earth in the Retort.

This volatile Salt becomes alkali by the means of fire, as other volatile Salts do, whereof I have already spoken in my *Remarks* upon the Principles; and there is no manner of probability that it should have been of this nature, either in the *Plant* or in the *Lees*, for the reasons that I have shewn in the same *Remarks*.

I shall add here, That if the alkali Salt did exist in the *Lees*, but is not able to expand it self, and get the predominancy of acids but only by a long Fermentation as the Chymists will have it, who follow the common way of discoursing of these things, it would then necessarily follow that the more *Lees* do ferment, the more they must lose of their acidity, because the alkali would destroy it. Nevertheless the contrary to this happens; for *Lees* do fower as they grow stale, and those who make Vinegar, do know well enough how to use the *Lees*, and to make them ferment with their Wine, when they would make Vinegar quickly.

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It seems to me from the consideration of this effect, that there is little reason to follow the Sentiments of some, who have writ that the Lees of Wine abounding in volatile Salt, and a sulphureous Spirit do contain but very little acid; for it is as plain as may be that this volatile salt is acid in the Lees, and is the same that makes the acid Spirit of Vinegar, being more volatile than many other acids, to volatilize with its phlegm in the distillation. It is true that Salt of Tartar drawn by the Retort, does rise more easily than Spirit of Vinegar, but this is from its being volatilized by the violent heat of fire.

Another mark that all the Salt of Lees is acid, is this, That the *Tartar* does all dissolve in the Wine, and turns into Vinegar; for very little or no Lees, or other *Tartar*, is to be found in the vessels wherein Vinegar is made, although there was some naturally before, or though some more were added to it as I have said in the Chapter of *Vinegar*.

Perhaps it will be objected, That Lees are sometimes added to Wines grown ropy and mucilaginous, to make them good again, and yet those Wines are not fowred by the Lees.

But this effect happens, when the former Fermentation becoming imperfect, through the too great quantity of phlegm for the little proportion of Salt that was in the Wines, the Salt of the Lees does rarefie, exalt, and conjoin with the oily parts of the liquor that the Spirit of Wine is made of, as I have said in the Chapter of *Wine*.

For the Wine does not fowr, so long as the Salt finds Oil to act upon, but it does so, when this Salt finds nothing to hinder it from expanding it self.

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The volatile Salt of *Tartar* produces much the same effects, as that of *Beans*, and other Seeds, and though many will needs give it sublime and extraordinary vertues in comparison with other volatile Salts, I do not see any reason for such high conceits, nor that effects do answer their pretences.

Volatile Salts have a good use, when they find the pores and humors disposed for perspiration, but they are full as dangerous, when the humors are not at all prepared; for by their volatility they do put the humors into so great a motion, that oftentimes the Fever is increased by them, and a translation made to the Brain: wherefore you must consider well the temper and present state of your Patient, before you presume to give them.

That which remains in the Bolt-head, after the volatile Salt, and Spirit are drawn off, is a black and stinking Oil mixt with the more phlegmatick part of the liquor; you must separate this Oil in a Tunnel lined with brown Paper; it is good for the Palsie, for cold Pains, and for Hysterical Women to smell to.

A *Lee*, or *Tartar Calcined* is found in the Retort, out of which you may draw a fixt alkali Salt, as out of common *Tartar*, but in a much less quantity, for that the greatest part of the Salt or Lees is volatilized.

Some have fancied that if the volatile Salt of any Plant were cast into the ground, there would spring up the same kind of Plant, as if the Seed it self was sown: But experience shews them very much mistaken. It is True, That if you water the earth, in which there is the Seed of any Plant, with the juice and decoction of the same Plant, the seed will shoot out sooner, and the

the Plant it self will appear sooner above ground, because the juice or decoction contains an essential and volatile Salt, which penetrates into the Seed, and serves it as dung. So the decoction of *Mushrooms*, being sprinkled at the foot of several Trees, will make *Mushrooms* arise in a short time, for it opens the Seed of them sooner than otherwise they would have been.

CHAP. XXII.

Of Opium.

OPIUM is a Tear which distils of itself, Opium or by Incision of the heads of *Poppies*, ^{what and} found very frequently in *Greece*, in the ^{whence.} Kingdom of *Cambaia*, and the Territories of *Grand-Cairo* in *Egypt*: there are three sorts of it, the Black, the White, and the Yellow.

The Inhabitants of those Countries do keep this *Opium* for their own use, and do send us only the *Meconium*, which is nothing else but the Juice of these same *Popy-heads*, drawn by expression, and then thickn'd, and wrapt up in leaves to transport the better. It is this Drug that we improperly call *Opium*, and always use for want of the true; but being more impure than the true, it hath not the same activity and strength.

A *Meconium* may be made after the same manner with the heads of those *Poppies* that grow in *Italy*, *Languedoc* and *Provence*, but it will prove much weaker than the former, The

The *Opium* which comes from *Thebes*, or else from *Grand-Cairo*, is accounted the best, you must chuse it Black, Inflammable, bitter to the taste, and a little acrimonious, its smell must be disagreeable and stupefactive.

Extract of Opium, called Laudanum.

THIS Operation is the purer part of *Opium* drawn in water and Spirit of Wine, and reduced to the consistence of an extract.

Cut into slices four ounces of good *Opium*, and put it into a Bolt-head; pour upon it a quart of Rain-water well filtred; stop the Bolt-head, and setting it in sand, give your fire by degrees, then increase it, to make the liquor boil for two hours, strain it warm, and pour it into a bottle.

Take the *Opium* which remains undissolved in the Rain-water; dry it in an earthen pan, over a small fire, and putting it into a Matrafs pour upon it *Spirit of Wine* to the height of four fingers; stop the Matrafs, and digest the matter twelve hours in hot Ashes; afterwards strain the liquor, and there will remain a glutinous earth which is to be flung away.

Evaporate both these dissolutions of *Opium* separately, in earthen or glass vessels, in a Sand-heat, to the consistence of honey, then mix them, and finish the drying this mixture with a very gentle heat, to give it the consistence of Pills, or a solid *Extract*. You shall have three ounces and an half of it.

Vernus.

It is the most certain Soporifick that we have in Physick, it allays all pains which proceed from too great

great an activity of the humors, it is good for the Tooth-ach, applyed to the Tooth, or else to the Temple-artery in a plaister, it is used for to stop spitting of blood, the bloody-flux, the flux of the *menfes* and hemorrhoids, for the colick, for hot defluxions on the eyes, and to quiet all sorts of griping pains: The Dose of it is from half a grain *Dose.* to three, in some convenient Conserve, or else dissolved in a Julep.

Remarks.

Opium is compounded of a spirituous part and a gross terrestrious Rosine; the spirituous part may be easily dissolved in water, but the resinous requires a more convenient *Menstruum*, such as *Spirit of Wine*. You must dry the *Opium* after the first dissolution, lest the *Spirit of Wine* be too much weakened by the watry part that remains, which would hinder the solution from being done so well as it should be.

Distilled Vinegar dissolves *Opium*, but the acids may diminish its vertue, by destroying or fixing its volatile part, which serves for a vehicle to the other.

Spirit of Wine alone might be used to dissolve both parts of the *Opium*, but it might be feared it would carry away with it the volatile part in the evaporation.

All that is in the *Opium* is preserved by my description; for the Resinous part dissolved in the *Spirit of Wine* cannot evaporate with it, because it is the heavier; and the other part which I call Volatile in comparison with the first is mixt with a little Rosine that keeps it back, while the water evapo-

evaporates. The truth of this I have found by experience, and any body else may try as well as I have done, by distilling these liquors. Lastly it is hard to use any greater precaution than this, for the preservation of all the pure parts of *Opium*, and fewer *Menstruums* can be used that are more convenient.

If in curiosity you weigh the glutinous earth after it is dried, you will find it to be half an ounce.

Opium
need not to
be torrefied.

Almost all Authors have appointed to torrefie *Opium* before it be dissolved, to the end a certain malignity which they say is in it may be evaporated; but that which they call malignity is nothing but the Spirits, or Sulphurs that are most volatile, whereof I spoke but now; so that by the Torrefaction they deprive it of its more active part. They do further add to the *Extract* commonly drawn with *Spirit of Wine*, Coral, Pearl, Treacle, *Extract* of Saffron, Cordial Confections, Hysterical Ingredients and other things which may resist a cold malignity in the fourth degree which they pretend to be in *Opium*. But experience convinces us that it is not so dangerous, when given in the foresaid dose, so that there is no need at all of losing its volatile part by Torrefaction, nor of mixing it with other ingredients which may hinder its operation, or retard its effect. It belongs to the Physician, when he thinks fit to give it, to judge whether there be any need of an Hysterick, or Cordial, which he may appoint to be mixed upon the spot.

An addition
to Laudanum.

I shall not stay to examine here whether *Opium* is cold or hot; they who have made the Anatomy of this mixt, do know very well that it is almost all of it Sulphur. I shall endeavour to explicate its effects

effects the most sensibly I can, according to the Rules of Chymistry.

The vertue of *Opium* consists in causing sleep, *How Opium causes sleep.* and that by calming the motion of the Spirits; for since watchfulness does proceed from the motion of the Spirits, which by rarefying the humors in the little passages of the Brain do augment their Circulation, it may surely be said with probability enough that sleep is caused by some condensation of the humors, which happens from a repose of the Spirits in the Brain. According to this Principle then there must be contained in *Opium*, and all other Soporificks, a certain substance that invicates the Spirits, and hinders them for some time from circulating so fast as they did before. Let us examine now, whether any such thing can probably be found in *Opium*, by the *Analysis* I have made of it: First of all I have observed a spirituous part, but after that hath been drawn out by means of Rain-water, there remains a gummous and terrestrious matter, and this is the substance that I find so proper to produce this effect. For nothing in Phyllick is so fit to thicken the blood, and other humors, as things that are mucilaginous: Milk, and the Emulsions which are drawn from divers Seeds, the Water-Lily, Lettice, nay and all temperate Aliments, do frequently incline to sleep, because they are impregnated with a gummous substance, which mixing in the blood, does serve to agglutinate the Spirits, and to moderate the quickness of their motion; this now being supposed, it is easie to conceive how *Opium* makes one sleep, seeing it is loaded with mucilaginous parts, which may be conveyed into the vessels.

But

Objection.

But without doubt it will be here objected, That *Opium* is full of subtile parts, which on the contrary instead of condensing the Spirits must needs rarefie them; and further, that according to my discourse all sorts of gummous matters should incline to sleep as well as *Opium*, which is a thing manifestly false.

Answer.

In the first place, I answer, That the Spirits of *Opium* being actuated by the heat of the Stomach do serve to raise the gummous part, and to conduct it into the little passages of the Brain; but having there introduced them, they either fly away through their volatile nature, or else condense with the moisture of the Brain. The same thing happens, after drinking any spirituous Liquor, such as Wine, Cyder, or Beer; for the sulphureous Spirits of these liquors carrying along with them some phlegmatick parts, do conduct them into the little vessels of the Brain, or else do cause some Coagulation there, whence it comes to pass that a man who is drunk commonly sleeps until the Spirits of the liquor he is intoxicated with, are in part spent, or evaporated out of his Brain.

In the second place, I say that all gummous or viscous things are not able to cause a sleepiness as *Opium* does, because they have not equally the same proportion of volatile Spirits to convey them into the Brain. They may indeed, by giving more consistence to the blood, moderate its motion a little, and excite some disposition to sleeping; but it will not be done so quickly as by the means of *Opium*, and they likewise do it with a great deal less force.

If you should mix volatile Spirits with the gum-mous matters I now spoke of, it would not follow that they would prove narcotick as *Opium* is, because the Spirits not being capable of so strict an union with those matters, as the spirituous part of *Opium* has received with its viscous substance, they would soon separate from one another in the stomach, and the gum-mous matter would want a vehicle to convey it into the chanel of the brain, as would be requisite in order to cause sleep.

The viscous parts of *Opium* insinuating into the small chanel of the Brain, do there produce a condensation or inspissation of the humors, until by little and little new Spirits do draw together, which by dissolving and rarefying this glue, do carry it along with the blood, or other humors. And then it is that the sleeping ceases, a man finds himself awake as before.

Reason may be given why pains in many places are asswaged after the effect of *Laudanum*, for these pains being caused by an agitation of the Spirits, when these Spirits are condensed, the pain consequently ceases. And this *Opium* does perform exceedingly well, as I have said. *How Laudanum allays pains.*

Those who fall into *Deliriums* in a continued Fever, do find themselves strangely relieved by the use of *Opium*, by reason that the principal cause of this accident is an acrimonious salt which is got into the Brain, and irritates its membranes. Now *Laudanum* which is a viscous substance, unites with these salts by means of its sulphur, and takes away their acrimony. It likewise stops the Dysentery, the flux of the *menfes*, and other Hemorrhagies, by sweetning the acrimonious salts which fomented them. *How it easeth those in a Delirium.* *In a Dysentery.*

Lastly,

How it
comes to
kill.

Lastly, *Opium* may be said to be one of the greatest Remedies that we have, when it is properly administred, and in a reasonable dose: but when it is given in too great a quantity, it so thickens and glues the humors in the brains by its viscous parts, that the Spirits which come afterwards to succour, not being able to dissolve this viscosity, are forced to stop and congeal likewise by little and little, until at last they lose all their motion, whence it comes to pass that many do dye upon the taking of *Opium*.

Some accu-
stom them-
selves to the
use of
Opium.

It is remarkable, That many do so accustom themselves to the use of *Opium*, that at last it is scarce able to make them sleep, except when they take three or four times as much as is commonly given. There are some Men in *France*, who can venture to take to a drachm, and this quantity does no more in them than two grains in another.

It is well known that the *Turks* will take of it to the bigness of a hazle Nut, to fortifie themselves when they are going to fight. The reason that they can do so is, That *Opium* passing a great many times into the small vessels of the Brain, hath in great measure dilated them. So that finding the passages very large, it makes little or no stop, unless taken in a greater quantity than before; for the *Turks* do not only accustom themselves to the taking of *Opium* by little and little, but being of a hotter Temperament than we, they supply more Spirits to the Brain for rarefaction of the humors, which *Opium* might there have condensed.

If the *Turks* do find themselves fortified so soon as they have taken *Opium*, it is by reason of these volatile Spirits, which work in them much the same effect, as the Spirits of Wine use to do with us.

SOME

Some have writ in opposition to what I have *Objection* establish'd on this subject, and say, That if we have regard to the quantity of narcotick Vapours that may arise from a small dose of *Opium*, it ought not to be imagined that those Vapours should be able to shut the chanel's of the Spirits and humors which make a defluxion upon some part; but that we should rather conclude the mitigation of pains, and stopping of defluxions to proceed from a just proportion of the Salt and Sulphur of *Opium*, and from the secret ferment they contain.

But this *Objection* will give us little trouble to *Answer*, when we consider that although the vapours caused by it are but few, yet the vessels of the Brain, in which the Animal Spirits do move, are exceeding delicate, and easie to be obstructed; and that the too great activity of the Spirits, which often fly into the diseased parts, being thus abated by the viscous nature of *Opium*, there must needs follow thereupon some ease and comfort, without any need at all of admitting a stoppage of the vessels which contain the humors.

As for the proportion of Salt and Sulphur in *Opium*, and the secret Ferment they pretend to acquaint us with, in order to explicate this matter, I know they are high terms indeed, but illustrate the matter very little, for though they say these Salts and Sulphurs do unite with *Homogeneous* particles that they meet with, and destroy such as are the cause of the distemper, yet we can never by this means obtain any clear *Idea* of that which makes *Opium* to be soporiferous.

Besides the vertue which *Opium* has to cause *How Opium is sudorific* sleep, I have observed that it is often Sudorific. *rifick*

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I conceive this effect must not be attributed only to the volatile parts of this mixt, which may be thought to operate this way, after they are disingaged from its viscosity, but rather to this, that during sleep, the inward vessels being as it were obstructed, or in some manner coagulated, and the Spirits finding resistance in their passage, do reflect, or bend their motion to the outward parts, and draw along with them some moisture through the pores. That which confirms me in this opinion is the consideration, that divers persons do use always to sweat, when they are asleep, though they have not taken any *Opium* at all. Now it may happen that in the operation of *Opium*, the Spirits finding more resistance within than they are wont, may tend outwards with the more force, and consequently incline to sweat more than in natural sleep.

Some prejudiced *Chymist* may not relish perhaps this my explication, because I do not season it with *Salt* enough, and *Sulphur*, and other principles; but although the five principles which may be drawn from Vegetables may also be drawn from *Opium*, I never use them but when they are necessary to explicate some effect; for whensoever I find I cannot satisfy my reason, nothing shall hinder me from pursuing my thoughts farther, and searching elsewhere for some better explication. In fine the Beauty of Chymistry does not consist in suiting our opinions to those of ordinary Chymists, who resolving to explicate all the Events of Nature by their Principles, which they manage according to their own fashion, do reject as ridiculous whatsoever does not agree with their Sentiments; but it rather consists

consists in examining and imitating what is done Naturally, and so searching for reasons that are most probable, and such as may be said to come nearest to truth, though a man be fain to forsake the way that others have trod in.

CHAP. XXIII.

Of Aloes.

ALOES is the thickned Juice of a Plant ^{Aloes} bearing the same name, it grows in many ^{what.} Countries, especially in *Egypt*, whence it is brought to us; the best is that which is called *Hepatick*, and *Succotrine*, because it bears ^{Different} the colour of a Liver, and a great deal of it is ^{kinds.} brought from an Island of *Persia*, called *Socotra*; the *Hepatick* is drawn by Incisions made on the Plant; it is friable, of an offensive smell, and very bitter taste.

There is another sort of *Aloes*, which doth not differ from the former, but only in that being drawn by expression, many impurities are mixed with it, it is compact, heavy, and smells not so strong as the other. It is called *Aloes Caballina*, ^{Aloes Ca-} because Barriers do use it most for their horses. ^{ballina.}

Aloes is not only used inwardly, as I shall shew, ^{use.} speaking of its Extract, but it is also used outwardly in many Unguents and Plaisters that are deterfive and discutient.

Tincture of
Aloes.

Virtue.

Its Tincture is also drawn with *Spirit of Wine*, by the same method as I shall describe that of *Myrrhe*; it is discutient, deterfive, good against Gangrenes, and to incarnate: It is used in Injections to dissolve gypsous humors, and to cleanse Wounds, and old Ulcers.

Extract of Aloes.

THIS Operation is an *Aloes* depurated from some Feculencies which it contained.

Dissolve eight ounces of *Aloes Succotrina* in a sufficient quantity of *Juice of Roses*, or a strong decoction of *Violet Flowers*; let the dissolution settle five or six hours, then decant it, and when you have filtered it, evaporate the liquor gently, until the matter remains in the consistence of an Extract, keep it in a pot.

Virtue.

Dose.

'Tis a good Remedy to purge the stomach, fortifying it withal: The Dose is from fifteen grains to a drachm in Pills; it is likewise good to bring down the *Menstrua*.

Remarks.

This Preparation should be made in flat earthen dishes glazed.

In making the Extract of *Aloes*, such a liquor is chosen, as is agreeable to its virtue; for the *Juice of Roses* and *Violets* are reckoned *Hepatick*, as well as *Aloes*. The Extract of the *Juice* that remains after evaporation, mixed with that of *Aloes*, may correct, or a little diminish the force of this Extract; for neither the Extract

of *Roses*, nor that of *Violets* is very purgative. Instead of these Juices, you may use the distilled waters of *Chicory* or *Borrag*, which are also esteemed *Hepatick*, and do not contain any Extract.

Each of these liquors I have mentioned, do dissolve *Aloes* entirely when it is good, and leaves but very little gross earth in it, which is cast away as useless. We may therefore say, That this Preparation is nothing but a purification of *Aloes* into an *Hepatick Liquor*. Pills are made of this Extract, and are called *Pills of Frankfort*, and some do add to them *Mastic*, *Rhubarb*, and other stomachick Ingredients; it is the Basis of the *Angelical Pills*.

Aloetick Pills may be taken at meat, or a little before meals, they seldom purge till the next day. Wherefore they have been called *Pilule antecium*. They bring the Hemorrhoids, and Terms, in that *Aloes* do rarefie the blood by its Fermentative Salt, and stimulates it out of the veins with great force.

The Extract of *Aloes* taken alone is pungent upon the stomach. It is given immediately before meat, that the aliments by their viscous quality may dull the keen operation of this remedy, and so may serve as a *Corrective* to it.

Frankfort
Pills.

Angelical
Pills.

CHAP. XXIV.

Elixir Proprietatis.

THIS Operation is a *Tincture of Myrrhe, Aloes and Saffron*, drawn in the Spirits of Wine and Sulphur.

Powder grossly, and mix together two ounces of good *Myrrhe*, the same of *Aloes Succotrina*, and one ounce of good *Saffron*; put this mixture into a Bolt-head, and pour upon it Spirit of Wine a fingers heighth above it; stop well the Bolt-head, and let them digest two days, then open it, and add to it Spirit of Sulphur, until the liquor is four fingers above the matter; shake it all well together, and having fitted another Bolt-head to the former in order to make a circulating vessel, set it in digestion in horse dung, or such like heat the space of four days. Then decant the liquor, and strain it, keep it in a bottle well stoppt.

Vertue.

It is a very good remedy to fortifie the heart, it purifies the blood, and works by sweat, it is likewise good to help digestion, to bring down the

Dose.

Menses, and in hysterical vapours; The Dose is from seven to twelve drops in some proper liquor.

Remarks.

The name *Elixir* has been given to many Infusions, or Tinctures of spirituous Bodies prepared in spirituous *Menstruums*. They would express by this word a very precious Liquor, or a *Quintessence*.

essence. Paracelsus was the first who described this Preparation. Many others since him have changed some circumstances relating to it, but all have tended to the same end, which is to draw forth the Tincture of those three Ingredients.

I have used but one ounce of *Saffron*, because this little flower is very light, and takes up a great deal of room. Though we should use more of it, the *Menstruum* would receive no more than it does, for there is as much in that quantity as is sufficient to fill the pores of the *Menstruum*.

I do leave the Ingredients to infuse two days in Spirit of Wine all alone; that only their more sulphureous part may be drawn by this Spirit. The acid Spirit which is mixed afterwards, being sweetened by the ramous parts of the Spirit of Wine has only force remaining to load itself with the Tincture. This mixture of Spirit of Wine, and Spirit of Sulphur do give the Tincture a very pleasant smell, and they have some cordial quality besides. Wherefore I would not advise the changing this *Menstruum*, as some do, by substituting in their place Spirit of Harts-horn.

If you would, you might draw more Tincture from that which remains in the Bolt-head, but it will not be so strong nor so good as the first, because it has already parted with its more volatile parts.

CHAP. XXV.

Of Tabaco.

TABACO called *Nicotiana*, or *Petum*, is a Plant with broad Leaves, that grows abundantly in many places of *America*, as *Brazile* and *Pern*, but the best that is brought into *France* is from *Florida*, it hath been transplanted among us, but our Country not being hot enough, that which grows here, is not so strong as the *Tabaco* that is brought out of *America*. There are divers kinds of it, or it has different sizes. The largest is very high, having a stalk an inch thick, round, hairy, full of a white juice; its Leaf is large, like that of *Elecampane*, and almost of the same form, a little rough; its Flower is long, of a purple colour; its Seed is small, redish; its Root is fibrous, white, and of an acrimonious taste: The whole Plant smells strongly; it grows in fat Earth, and may be cultivated in Gardens: It contains partly an exalted Oil, and much of a very strong acid Salt.

Tabaco, either chewed or smoked now and then, makes a great discharge of humors from the Head; but if it be used too immoderately, it is apt to cause several Diseases, such as the Palsie, and Apoplexy. It is beaten, and applied to tumors to disperse them, it being full of Spirits which do rarefie them and open the pores. It is likewise infused in common water, and Tettars and other Itchings

Itchings of the Skin are washed with this infusion, but you must have a care that the water be not too much charged with it, for fear of giving a vomit.

It is Vulnerary, and it is sometimes made into a Syrup for an *Asthma*, as the decoction of it is sometimes used in Clysters, for the Apoplexy, Lethargy, and suffocation of the Matrix.

Tabaco kills Serpents, Vipers, Lizards, and such like Animals, if you open a hole in their flesh, and thrust a little bit into it, or if you should smoke them with it.

Distillation of Tabaco.

PUT into a Glass-Cucurbit eight ounces of good *Tabaco* cut small, pour upon it about an equal weight of *Phlegm of Vitriol*, cover the Cucurbit with its head, and digest the matter in sand for a day, fit to it a Receiver, and distil about five ounces of liquor in a small fire, keep it in a Viol.

It is a powerful Vomit, the Dose is from two drachms to six in some proper liquor, it is likewise good for Tettars, and the Itch, being rubbed lightly with it.

Virtue.
Dose.

Put that which remains in the Cucurbit into an earthen Retort, or Glass one luted, place it in a Furnace, and fit to it a great Receiver, and luting close the joints, begin with a small fire to raise all the phlegm; augment it by little and little, and the Spirits will come forth confusedly with a black Oil; continue the fire until there comes no more, then let the vessels cool, and unlute them; pour that which you find in the Receiver into a Tunnel lined with brown Paper, the watry part will pass through

*Oil of
Tabaco.*

through, while the black and fetid Oil remains in the filter, keep it in a viol : a drachm of it may be mixed with two ounces of Hogs-grease, it is a good Remedy for the Itch, and for Tettars.

Fixt Salt.

An Alkali salt may be drawn from the Coals that remain in the Retort, after the same manner as the Salt of *Guaiacum*. This Salt is a Sudorific, the Dose is from four grains to ten in some convenient liquor.

*Virtue.
Dose.*

Remarks.

Tabaco is full of such piercing sulphurs and volatile Salts, that so soon as ever it is in the stomach, it falls a pricking the Fibres, and moving to vomit.

The *Oil of Tabaco* is so great a Vomit, that if one should but hold ones Nose a little over the Viol, in which it is kept, it would make one vomit.

Experiment

One day I made a small Incision in the skin of a dog's thigh, and thrusting in a little tent dipped in the *Oil of Tabaco*, the Dog immediately purged both upwards and downwards with a great deal of violence.

The *fixt Salt* of *Tabaco* may be made as I have said, but if you would have any quantity of it, you must join a great deal of other *Tabaco* with it, for receiving so little matter out of the Retort, it would be hard to get a drachm of Salt.

CHAP.

CHAP. XXVI.

Extractum Panchymagogum.

THIS *Extract* is a *farrago* of the purer substances of divers purgative and cordial medicines, to purge out all humors.

Take an ounce and a half of the *Pulp* of *Coloquintida*, one ounce of the *Pulvis Diarrhodon Abbatris*, so much good *Agarick*, and two ounces of black *Hellebore*, powder them all grossly, and put them into a matras; pour upon it rain-water distilled, four fingers above the mixture. Stop the matras close, and set it in digestion in hot sand, or in horse dung three or four days, and shake the vessel ever now and then. After this pass your infusion through a cloth: Pour upon the residue a like quantity of the same liquor; let it infuse as before, then strain and express it strongly; mix your infusions, and let them settle, until they become clear, decant them, and evaporate the liquor in an earthen pan in a sand-heat with a little fire, to the consistence of a Syrup: then mix with them half an ounce of *Rosine* of *Scammony*, and two ounces of *Extract* of *Aloes*, evaporate the whole to the consistence of an *Extract*, you shall have four ounces of it.

It purges all the humors well, the Dose is from
one scruple to two in Pills.

Vertue.
Dose.

Remarks.

Remarks.

Coloquin-
tida.

The flesh or pulp of *Coloquintida* is nothing but the Apple it self cleansed from its Seeds. It purges the Brain, the best is that which is whitest and lightest.

Diarrho-
don Abba-
tis.

The powder of *Diarrhodon Abbatis* is Cordial, and resists the malignity of humors, it takes its name from the *Rose*, which is its *Basis*.

Agarick.

The *Agarick* is a resinous *Mushroom*, that grows on the *Larix*, the best is the whiter, lighter, and most friable; it is used for to purge the Brain.

Black Hel-
lebore.

The root of *black Hellebore* is a very strong purger of Melancholy, wherefore it is given to Hypochondriacal persons, and even to the Maniacal; it gives a vomit, when taken alone, but with this mixture it fixes downwards; the white is a poison, taken inwardly; it is never used but for sneezing powders.

Scammony

Scammony is a very purgative resinous juice, the best is most friable, and which being powdered hath a gray colour drawing towards white: its Rosine is drawn from it as that of *Jalap*.

Aloes is said to purge *Choler*, I have spoken of its vertues sufficiently already, when I described its *Extract*.

Spirit of Wine is commonly used to make this *Extract*, and it may seem to be so much the purer being drawn by the dissolvent, rather than by a watry *Menstruum*; for Spirit of Wine dissolves only the more Balsamick and purer part of mixt bodies: But nevertheless I chuse rather to prefer the use of Dew, or else Rain-water, nay and even common water before Spirit of Wine for several reasons,

First,

First, Because in the evaporation of the liquidity of the *Extract*, drawn by Spirit of Wine, a great many of the more subtile parts are lost, which this dissolvent had volatilized. And indeed it cannot be denied, but some useful parts will evaporate, let us use what dissolvent we please; but it is plain there is no such great loss, when watry *Menstruums* are used, as when Spirit of Wine. Now we should always prefer such *Menstruums*, as are best able to preserve the vertue of the mixt, whose *Extract* we intend to draw.

The second is, Because Spirit of Wine does always leave some impression of heat and acrimony in the *Extracts* it draws, which the liquors that I use do not do.

The third is, Because Spirit of Wine is not so convenient a *Menstruum* to dissolve the Salts which the Ingredients we use are full of, and it is in this Salt, that their greatest vertue does consist.

Wherefore we ought to chuse such dissolvents, as can best preserve the vertue of mixt bodies, and such as are familiar to our nature. We must use Spirit of Wine to extract Rosines, such as that of *Scammony*, *Jalap*, *Turbith*; but whenever an *Extract* can be drawn with a watry *Menstruum*, it is better to use that, rather than another, for the reasons I have mentioned.

Purgative Medicines have been divided into *Melanagogues*, *Phlegmagogues*, *Cholagogues*, and *Hydragogues*. By *Melanagogues* are understood those that chiefly purge *Melancholy*, by *Phlegmagogues* such as purge *Phlegm*, by *Cholagogues* those that evacuate *Choler*, and by *Hydragogues* those which purge *Serofities*, or waterish humours. So then by mixing these four sorts of Remedies,

*Difference
of purga-
tive Medi-
cines.*

a com-

a composition is made that is called *Panchymagogue*, that is to say, purging all the humors, as doth the *Extract* I have described.

Now to explicate the action of Purgative Remedies upon all the several humors, you must consider in the first place, that Melancholy is a very Tartareous humor, and full of fixt Salts: that Phlegm is very viscous, and descending from the Brain sticks like Glue to the internal Membranes of the *Viscera*, and that *Choler* is very thin and easie to rarefie.

The Remedies which are called *Melanagogues*, such as *Scammony*, *Senna*, &c. are full of Lixivious Salts, which are very good dissolvents of the Melancholick humour contained in the lower parts, in that these sort of Remedies do always descend, and being strong purgers, do raise a Fermentation where ever they come.

Phlegmagogues, such as *Agarick*, *Coloquintida*, &c. do purge the *Phlegm* chiefly that is contained in the Brain, because these Remedies are full of volatile parts which easily sublime thither by means of the natural heat, and rarefying this humor do make it come down by the ordinary ways of Purgation.

Cholagogues, such as *Cassia*, *Rhubarb*, &c. which are mild Remedies, and are not strong enough to excite so great a Fermentation as the others, do only purge *Choler*, it being very soluble, and easie to ferment; but they are not able to reach *Melancholy*, or *Phlegm*, by reason of their thickness; wherefore there is no need of wondring, why a greater evacuation of *Choler* than other humors is effected by these Remedies.

It is further observable, that the Remedies which purge *Phlegm* and *Melancholy*, do remain, or leave their impression in the body a longer time than those which purge *Choler*, because they more abound in Spirits of Salts: Moreover it is not to be imagined, that these *Phlegmagogues* and *Melanagogues* do evacuate no *Choler* at all, for they do force away all they can meet with; but because it is then mixt with other humors, it appears not so plainly as when it is wrought upon alone.

As for *Hydragogue* Remedies, such as the Rins of *Jalap*, *Scammony*, and Polychrest Salts, they purge water, because they fix upon the Glandules, with which the inward membranes of all the Bowels do abound; they open them by their acidity, and make the serosity of them to run out.

Some Moderns, not being able to understand these differences of purgative Remedies, have plainly denied it, and do say, That every remedy purges every sort of humor indifferently, and that there is no necessity of supposing such particular determinations of one going to find out one humor, and another another; but by a small observation of the practice of Physick, one may soon remark the different effect of purgative Medicins upon the different humors of the Body; and tho' the practice of Physick did not prove it, yet the Rules of Chymistry would sufficiently demonstrate it: For seeing the different nature of these substances, upon which we make Experiments, do require different dissolvents, why should we not think, that divers purgatives are necessary to loosen the humors of the Body which are of a different nature? There is more difficulty

difficulty in comprehending how one kind of purgative can dissolve all humors indifferently, than in believing that each rarefies the humor which is most agreeable to it.

CHAP. XXVII.

Of Turpentin.

What it is.

Turpentin is a liquid Rosin, in the consistence of a Balsom, which comes by incision from several kinds of Trees, which grow, in great abundance, in hot Countries, as Italy, Spain, Cyprus, the Isle of Chios, Provence, and Dauphiné.

Turpentin of Chios.

The Turpentin which comes from the Isle of Chios is best esteemed, and is also the dearest. It is used in the composition of Treacle: Its consistence should be solid; its colour greenish-white; its taste insipid, and having but very little smell. It flows from the Turpentin Tree which is of an indifferent height, having Leaves long, sharp, firm and green, like those of the Laurel, but much smaller, its Flowers resemble red Grapes; its Fruit grows like Juniper-berries, each containing a small Nut.

Description of the Turpentin Tree.

Venice Turpentin.

The Turpentin commonly used amongst us is improperly call'd Venice Turpentin: it is an oily liquor, clear, transparent, clammy, of a yellowish white colour, fragrant, and a little biting in the taste: It has the consistency of a Syrup in Summer, and

of a *Balsom* in Winter, but it thickens as it grows old. It is drawn by incision from the *Pine-tree*, the *Firr*, and the *Larix*, or *Larch-tree*, in *Dauphine*, from whence it is brought. The Peasants there call it *Bijon*, but the true *Bijon* is that which runs in Summer time without incision from the same Trees, and which is very like to the true white *Balsom* of *Peru*.

Turpentin is very Diuretick, good for the *Vertue*: Stone, the Nephritick Colick, the retention of Urine, Gonorrhœas, Ulcers of the Reins, Bladder and Matrix. It is given in a Bolus, or dissolved in some liquor by means of a little yelk of an Egg. The Dose is from one scruple to a drachm. It gives the Urine a smell much like *Violets*, and it sometimes causeth the Head-ach. *Dose*

The difficulty of taking clear *Turpentin* in a Bolus, and its unpleasant taste when dissolved into a potion, hath put them upon the search of more agreeable means of taking it: Some boil it in water about half an hour, until it has acquired some solid consistency, which is called *Colophon*, or boiled *Turpentin*, and then they make it up into Pills before it be cold. It is very easie to swallow this way, but the water in boiling has taken away much of its essential Salt, in which consists its greatest vertue.

Others do wash it several times in the distilled water of *Pellitory*, *Radishes*, or *Turnip*, to make it less liquid. This washing does not take away so much of the essential Salt as the boiling, but yet there goes always some away. The best method therefore is to take it in its natural state, only giving it the consistency of a Bolus, by *Turpentin*: means of some Powders agreeable to its Vertue, *Best method of taking*

as purified *Nitre*, *Crystal of Tartar*, *Liquorish*, *Woodlice*. It is also used in *Clysters*, being dissolved in *Oil*, or in the yolk of an *Egg*.

It serves outwardly as a *Balsom* for contusions and wounds.

If in curiosity you should boil a little *Turpentin* in water for a quarter of an hour, and after removing it from the fire, if you pour cold water upon it, you will see a little skin spread itself upon the water with many curious marble colours: And if you gather this skin into a lump, it will become a white *Turpentin*.

Distillation of Turpentin.

THIS Operation is a separation of the *Oil of Turpentin* from its terrestrious part.

Take three pounds of good *Turpentin*, and pour it into a Retort large enough to remain half empty. Add to it a handful of *Stupe*, to prevent the thicker parts of the *Turpentin* from rising when the liquor distils; you must cleanse the inside of the neck of the Retort, and place it in a Furnace to distil in an open fire; fit to it a Receiver, and luting the joints, begin the Distillation with a very small fire only to warm the Retort, and drive out a volatile Spirit, after which augment the fire by degrees, there will come forth first a clear Oil, then a yellow Oil, and at last a red Oil; take care to separate these liquors as they do distil, and when you see the red Oil begin to come thick, take away the fire, and when the vessels are cold, unlute them. Keep all these liquors separately in *Viols*.

The

*Spirit of
Turpentin.*

*Clear yellow
and red
Oil.*

The volatile Spirit is an excellent Aperitive, it ^{Vertue.} is given from four to twelve drops in some appropriate liquor, to expel Gravel out of the Reins or Ureters, in the Nephritick Colick; or to dissolve Viscosities, it is likewise used in *Gonorrhœas*. ^{Dose.}

The first Oil serves for the same uses as the Spirit; the second and third do serve as a Balsom ^{Balsom of Turpentin.} to consolidate Wounds, discuss Tumors, and to fortifie the Nerves.

Break the Retort, and you'll find in it a mass, melt and strain it to separate the Stupe; it is a good *Colophone*, and is used in Plaisters to dry ^{Colo- phone;} and to consolidate.

After this manner may be distilled *Rosines, Mastich, Frankincense, Tacamahacca, Gum Elemi, Varnish, Labdanium*, and other *Gums* of this nature.

Remarks.

The *Spirit of Turpentin* is properly an ethereal Oil mixed with a little phlegm, and acid essential Salt, which renders it Aperitive; it is this Spirit that gives the *Turpentin* its smell.

A great fire is requisite for to draw the last Oil, and it becomes red, through some Fuliginosities that fall upon it, before it comes forth of the Retort.

If you should continue to raise the fire, until there comes no more liquor, you'd find in the Retort nothing but a little light, and very rarefied matter that is good for nothing.

The *Oil of Turpentin* that is bought at the Druggists, is a mixture of Spirit and yellow Oil.

The *Oil of Turpentin* being mixed with that of *Vitriol*, there grows a very considerable heat, and

T t 2

if

if the *Oil of Vitriol* is strong, it makes an ebullition. I have endeavoured to give you a reason for it in the *Remarks* which I have made upon Distillation of *Vitriol*.

CHAP. XXVIII.

Of Benjamin.

Benjamin called by some *Assa Dulcis*, is a Rosine that distils from a great Tree in Foreign Countries, the name of it is unknown, though many have thought fit to call it *Laserpitium*; this Tree is very common in *Samaria*, and in many other adjacent Countries.

Virtue.

Benjamin is very much used by the Perfumers, and it hath use also in Physick, to resist the malignity of humors, and to fortifie the Heart and Brain; you must chuse it clean, friable, and full of white spots, and that sort is called *Amygdaloides*.

Flowers of Benjamin, and its Oil.

THIS is an exaltation of the volatile Salts of *Benjamin*, and a separation of its Oil, by distillation.

Take an earthen pot, high and narrow, with a little border round it, put into it three or four ounces of clean *Benjamin* grossly powdered; cover the

the pot with a coffin of Paper, and tie it round about under the border; set the pot into hot ashes, and when the *Benjamin* is heated, the *Flowers* will sublime; take off the Coffin every two hours, and fix another in its place; stop up quickly in a glass the *Flowers* you find in the Coffins, and when those which afterwards sublime do begin to appear oily, take the pot off the fire; put that which remains into a little glass Retort, and fitting a Receiver to it, distil in a Sand-heat a thick and fragrant Oil until nothing more comes forth, there will remain in the Retort nothing but a very spongy earth.

Oil of Benjamin.

The *Flowers* are good for asthmatical Persons, and to fortify the stomach; the Dose is from two grains to five in an Egg, or in Lozenges. The Oil is a Balsom for Wounds and Ulcers.

*Vertuz.
Dose.*

Remarks.

Benjamin being full of a great many volatile parts, easily sublimes over the smallest fire; the *Flowers* do rise in little needles that are very white; but if you give never so little fire more than should be, they carry along with them a small quantity of Oil, which makes them to be yellow and impure. You must therefore perform the Operation in hot ashes, or in Sand, to have the *Flowers* fair.

The *Flowers of Benjamin* have a very pleasant acidity.

Tincture of Benjamin.

TAKE three ounces of *Benjamin*, and half an ounce of *Storax*, powder them grossly, and put them into a Bottle, or Matrafs half empty, pour upon them a pint of Spirit of Wine, stop your vessel close, and set it in warm horfeding, leave it in digestion for a Fortnight, after which filtrate the liquor, and keep it in a Vial well stoppt: some do add to it five or six drops of Balsom of *Peru*, to give it a better finell: It is good to take away spots in the Face, a drachm of it is put into four ounces of water, and it whitens like Milk, this water serves for a wash, and is called *Virgins Milk*.

Virgins
Milk.

Remarks.

This *Tincture* is a dissolution of the Rosine of *Benjamin* made in *Spirit of Wine*. When it is mixed in a great deal of Water, it makes a Milk, because Water weakens the *Spirit of Wine*, and makes it quit what it held up dissolved. If you let this Milk settle, the Rosine precipitates to the bottom of the vessel, and the water becomes clear.

The *Storax* is added to this *Tincture*, to encrease the goodness of the finell.

CHAP.

C H A P. XXIX.

Of Camphire.

Camphire is a Rosine that distils drop by drop from a great Tree that is much like to a Walnut-tree in the Island *Borneo* in *Asia*. Little Cakes of it are likewise brought out of *China*, but that is not so good: The *Hollanders* refine it, by sublimating it, and separating it from an earth that remains at the bottom of the vessel. It must be chosen White, transparent, clean, friable, without spot, and such as is hard to quench, when once lighted.

Camphire is compounded of a *Sulphur* and *Salt* so exceeding volatile, that it is very hard to keep it any time, and it always loses something, let it be never so closely stoppt.

It is an excellent Remedy for the Fits of the Mother, it is not only smelt to by Women in this condition, and used in their Clysters, but also taken inwardly; for it is lighted, and then quenched five or six times in some water proper to the Distemper, and so the water is given to drink; it is likewise good for intermittent Fevers, being hung about the neck, because in its evaporating away, it insensibly enters through the pores, and causes a rarefaction, and transpiration of the humor which caused the Disease: and for the same reason it is that several Drugs applied to the Wrists and other places, have often cured diseases: But you must observe that this sort of Remedies

medies is always of a very Spirituous Nature, two drachms of *Camphire* is dissolved in a gill or fourth part of a pint of *Spirit of Wine*, and this dissolution is called *Spirit of Wine Camphorised*, it is good in the Apoplexy, and in hysterical Maladies; in the Scurvy, and for resisting the malignity of humors. The Dose is from six drops to fifteen in some proper liquor. It is also applied outwardly in Scrophulous Tumors when they are opened, and in other Wounds, for stopping a Gangreen. It is also found to be of excellent use in the Tooth-ach, a little Cotton is dipt into it, and put into the aking Tooth.

The *Spirit of Wine* may be mixed with more or less *Camphire*, according to the use and design of it.

Oil of Camphire.

THIS Operation is a *Camphire* impregnated with *Spirit of Nitre*, which converts it into a liquor.

Powder grossly three or four ounces of good *Camphire*, put it into a Matrafs, and pour upon it twice as much *Spirit of Nitre*, stop your vessel close, and set it over a pot half full of water a little heated; stir it ever now and then, to help forward the dissolution which will be finished in two or three hours, and then you'll find the *Camphire* turn'd into a clear Oil which swims above the Spirit, separate it and keep it in a viol well stoppt.

It is used for the Caries of bones, and to touch Nerves that are uncovered, in wounds; for the pain of the Teeth, by dipping a little Cotton into it, and applying it.

Remarks.

Remarks.

This Oil is nothing but a dissolution of *Camphire* in *Spirit of Nitre*; for if you pour water upon it to destroy the force of the *Spirit*, it returns into *Camphire* as before.

Of all the Rosines this is the only one that can dissolve with *Spirit of Nitre*.

This dissolution is made without Ebullition, or sensible heat, because the *Camphire* consisting of thin disunited parts, the acids do enter among them and make an easie separation: Again acids mixing with Sulphurs do never raise any ebullition, because they find those bodies too pliant and yielding, to make sufficient resistance.

If you have used three ounces of *Camphire* in this Operation, you will obtain four ounces of Oil, and the *Spirit of Nitre* will have lost an ounce; this last will likewise have lost much of its acrimony.

Some have censured this Operation by reason, say they, of the violent impression which the corrosive Spirit does give to the *Camphire* in its dissolution, and that therefore the acrimony of the medicin renders it of a dangerous use.

But seeing this Oil is not wont to be given inwardly, methinks there is very little reason for this scruple: There are medicins which are much more acrimonious than this, which nevertheless are not esteemed dangerous to be used. Again there is occasion for this acrimony in the use that is made of this Oil, for the *Spirit of Nitre* which is mixed with it does very much help the *Camphire* to decterge Wounds, and to cleanse rotten bones.

I may

I may also affirm, That this Oil of *Camphire* may be taken inwardly, without any danger, from two to six drops in Hysterical Vapours and Ulcers of the Matrix; for I my self have made experiment of it a great many times: Moreover, what reason is there to fear any danger of the *acrimony* of the *Spirit of Nitre*, when only a drop or two is given in a large Dose of the Oil of *Camphire*: For besides, that the sulphureous parts of *Camphire* are well mixed with it, and by that means have very much weakned its points, no body makes any difficulty of giving to a sick Person four drops of the *Spirit of Nitre* in a glass of *Ptisane*, if the Disease require it.

CH A P. XXX.

Of Gumm Ammoniack.

GU M M *Ammoniack* is so called, because it distils from a sort of *Ferula*, or Fennigiant, that grows near the place where the Oracle of *Jupiter Ammon* stood heretofore; the best is in large yellowish tears, and white within, dry, pure, having a bitter and disagreeable taste.

Virtue. It is given inwardly in Deoppilative Electuaries for Scirrhus Tumors of the Liver, Spleen, and Mesentery; it is used in Emollient and Attractive Plaisters.

The way to purifie it, is to dissolve it in Vinegar, then passing it through a cloth, all the moisture is evaporated

evaporated away over the fire; by this means it is cleansed from some straws, or other little impurities that it contained. But some part of its Volatile Spirits are evaporated at the same time, and in them consists its greatest virtue, while some others are fixed by the acid, which always hinders the motion of Volatiles. Wherefore I would never advise this *Purification* to be made; I would rather, after chusing it as clean as may be, only powder it in a Mortar, to mix it with what may be thought fit; for though there should be some little straws in it, that would never be able to alter the nature of the Remedy, or diminish its virtue so much as doth the destruction of its volatile Salts by the Vinegar.

The same thing may be considered in the use of all other *Gumms*; and if some of them, as *Galbanum* and *Opopanax*, are too moist to be powdered, you may cut them into little slices, and dry them in the Sun.

Distillation of Gummi Ammoniack.

THIS is a separation of the Oil and Spirit of *Gummi Ammoniack* from its earthy part.

Put a pound of *Gummi Ammoniack* into an earthen Retort, or glass one luted, great enough for two thirds to remain empty; place this Retort in a Reverberatory Furnace, and fitting to it a Receiver, begin the distillation with a very little fire to warm gently the Retort, and drive forth drop by drop a little phlegmatick water. When the Vapours begin to appear, throw out that which is in the Receiver, and resetting it, and luting

luting close the joints, encrease the fire by degrees, and continue it until all is come forth. Then let the vessels cool and unlute them; pour out that which is in the Receiver into a Tunnel lined with brown Paper, the Spirit will pass through, and leave the thick black Oil in the filter, keep it in a Viol: It is good for the Palsie, and Hysterical Diseases: The diseased parts are rub'd with it, and it is given to Women to smell to.

Spirit.

Oil.

Virtue.

Rectification.

Virtue.

Dose.

Put the Spirit into a glass Alembick, and Rectifie it by distilling it in Sand. 'Tis a good Remedy against the Plague, and all sorts of malignant diseases; it is used in the Scurvy, and all manner of Obstructions; the Dose is from eight to sixteen drops in some proper liquor.

The Spirit of all other *Gumms* may be drawn after the same manner.

Remarks.

Two thirds of the Retort must remain empty, because the *Gumm* rarefies exceedingly as it heats, and would be apt to come forth in substance, if it had not room enough. There is no need of adding alkali's for the Rectification of this Spirit, as many Authors would perswade us; this circumstance doth rather more hurt than good, because alkali's do spoil these sorts of Spirits, as I have said when I treated of the Rectification of the Spirit of Tartar.

The phlegm is taken out of the Receiver before the Spirits come forth, in order to their being the purer. You will have six drachms of phlegm, three ounces and seven drachms of Spirit, six ounces of a black and stinking Oil, and there remains in

the Retort four ounces six drachms of a black, light and very spongy matter, which is to be flung away. It is likewise a little inflammable by reason of fuliginosities which have fallen upon it. And this is that which gave it the black colour; a great deal of the ashes of this matter is requisite to make a little Salt, for the Salt of *Gumms* being commonly more volatile than fixed, it comes forth almost all of it in acid Spirit.

CHAP. XXXI.

Of Myrrhe.

MYRRHE is a Gummy juice that distils from a thorny Tree, of a middle height, by Incisions that are made into it; this Tree grows commonly in *Ethiopia*, and *Arabia*, and because the Inhabitants of those countries are thought to feed on Serpents, the *Myrrhe* that is brought thence is called *Trogodytick*. The Antients were wont to collect from the same Tree a liquor that fell from it without Incision, which was called *Stacten*; it is only a liquid Gumm, but I am apt to think it should have more vertue than common *Myrrhe*, because it was the more spirituous part, which filtrated through the pores of the Bark of this Tree.

You must chuse such *Myrrhe* as is friable, light, odoriferous, clear, and such as is in small pieces, of a yellowish colour, and bitter to the taste; it is
aperitive

Vertue. aperitive and discutient; it is much esteemed for obstructions of the *Uterus*, and to bring down the *menstrua*, and to quicken Womens labour; it also resists malignity of humors, it is used in Corroborative Remedies, and discutient Plaisters.

Tincture of Myrrhe.

THIS Operation is a solution of the oily parts of *Myrrhe* in Spirit of Wine.

Put what quantity you please of good *Myrrhe* powdered, into a Bolt-head, and pour upon it Spirit of Wine four fingers high; stir the matter, and set it in digestion in warm sand, two or three days, or until the Spirit of Wine is loaded with the *Tincture of Myrrhe*; then separate the liquor by Inclination, and keep it in a Viol well stoppt. It may be used to expedite Womens Labour, to bring down the *Menstrua*, and in the Palsie, Apoplexy, Lethargy, and all diseases that proceed from Corruption of humors; it is Sudorifick and

Vertue.

Dose.

Aperitive: The Dose is from six drops to fifteen in some proper liquor; it is commonly used in outward applications, or mixed with the *Tincture of Aloes* to discuss cold Tumors, and to dissolve gypsous humors by way of Injection, and in the Gangrene.

Tincture of Castor and Saffron.

After this manner may be made the *Tinctures of Castor* and *Saffron*, which are much esteemed in hysterical cases; The Dose of them is from four to twelve drops in Balm or Mugwort water.

Remark.

Remarks.

Though *Tinctures of Myrrhe* are daily drawn in Wine, or Brandy, yet the best that can be prepared is with Spirit of Wine, because this *Menstruum* receives the more Oily, or Balsamick part of the *Myrrhe*; whereas the phlegm of Wine does cause it to dissolve, and impregnate with the more terrestrious part of the *Gumm*, as well as with the Oily.

Some do use to evaporate this *Tincture* to the consistence of an Extract, but because thereby they are fain to lose the more volatile part of the *Myrrhe* with the Spirit of Wine, I do conceive it better to use the *Tincture* it self as I have described it.

The *Tincture of Castor* makes the water white, into which you drop it, by reason of a *Rosine* which it contains, which is the same I have said, speaking of the *Rosine of Jalap*.

Oil of Myrrhe per Deliquium.

THIS Preparation is a solution of the more separable parts of *Myrrhe*, made with whites of Eggs.

Boil Eggs until they are hard, then cutting them in two, separate the Yelk, and fill the White with *Myrrhe* powdered, set them on little sticks placed conveniently on purpose, in a plate, or earthen pan, in a Cellar, or some such moist place, and there will distil a liquor to the bottom of the vessel, which you may take out,
and

and keep for use. This is called the *Oil of Myrrhe*. It is good to take away spots, and blemishes in the face, applied outwardly.

Remarks.

Though this liquor improperly called *Oil*, is only the more soluble part of *Myrrhe* humected with the moisture of whites of Eggs, and the Cellar together, yet it is the best of any that have been invented, whether you should draw it in Spirit of Wine, or distil this Gumm in a Retort; for by Spirit of Wine the more volatile part of *Myrrhe* is lost, either by Distillation, or Evaporation; and it is so torrefied in a Retort, that it loses its best virtues; whereas *per Deliquium* what volatile this Gumm contains is preserved in its natural being, for the wet that mixes with it is no ways capable of destroying or altering its nature.

THE
THIRD PART.*Of Animals.*

IT is very probable, That all *Animals* come from Eggs, in which they are contained, as the Plant is in the Seed: But because the Eggs of all *Animals* are not so easily discovered as the Seeds of Plants, nor the *Animal* so well perceived in the Egg, as the Plant in the Seed, even by the help of a Microscope; therefore this opinion is not universally received. Nay there be divers, both *Anatomists* and *Philosophers*, who call it in question. Whatever there be in this, when the *Animal* is formed, the juice or moisture with which it is nourished, and its humours, do circulate so well in the body, by the help of some *Spirits*, that almost every thing there is volatilized: For in the separation of the Principles of *Animals* there is found but very little of mixt matter. Indeed, all the substances which are drawn from them are not equally volatile, for some are more than others; the Volatiles of *Toads* and *Scorpions* are not so subtle as that of the *Viper*. Hair, Urine and Blood, yield much more volatile substance than Bones. Fishes give commonly much less than terrestrial *Animals*. *Woodlice*, *Earth-worms*, and *Snails* are less volatile than

than *Lizards* and *Serpents*. The *Hart*, the *Goat*, the *Dog*, the *Wolf*, the *Fox*, the *Castor*, the *Cat*, the *Hare*, *Rabbit*, the *Rat* and *Mouſe*, do give more volatile Principles, than *Calves*, *Sheep*, *Oxen*, *Horses* and *Aſſes*. All the parts of a Man are filled with volatiles: But to me (of all *Animals*) the *Viper* ſeems to have moſt. *Bears* do alſo contain very much, and *Harts-horn* gives more than *Ivory*. *Hair* gives more than any other part of a Man, and *Milk* much leſs than any other liquors that are found in *Animals*.

Animals: The parts, and their Excrements, have different Vertues according to the quantity of their volatile Principles and their mixture. Thoſe, whoſe Principles are very volatile, have commonly a ſudoriſick quality, as Man's Blood, the blood of *He-goats*, the *Skull of a Man*, *Vipers*, *Harts-horn*, becauſe when their ſubſtance is heated in the ſtomach it diſperſeth through all the Body, and paſſeth through the Pores: But thoſe, whoſe ſubſtances are leſs volatile, have often an aperitive Vertue, as prepared *Toads*, *Woodlice*, *Crabs*, becauſe their Salt being weighty does precipitate into the Blood, and opens the paſſages of Urine. Thoſe, whoſe Principles have well fermented, as what is called the *Caſtorſtone*, *Urine*, *Muſk*, *Civet*, and the Excrements of many *Animals*, ſome of them are good for the *Epilepſie*, *Apoplexy*, *Palfie*; others for *Hysterical Maladies*, becauſe their volatile ſubſtance aſcends to the Brain, and fortifies the origin of the Nerves. *Urine* is a good Remedy for the *Gout*, it exalts and diſſipates the Humor by sweating, by Stool, and by Urine. Two or three glaſſes of it taken daily is good alſo for Vapours.

Sach

Such *Animals* as you do use in Physick must be chosen in the season when they are at their greatest vigour. Those who die of any disease are never to be used, because the best of their substance is lost.

CHAP. I.

Of the Viper.

Passing by the fabulous Stories that the Ancients have left us concerning the Birth of the *Viper*, I shall say it is a sort of Serpent, that comes into the World by eating through the belly of her Dam, and killing her; whence she is called, *Vipera, quod vi pariat*.

This *Animal* is very common in *Dauphiné*, and *Poitou*, from whence it is carried all over *France*. While it is in the field it feeds upon several little *Animals*; but when taken and shut up in any place, it may be kept a whole Summer without eating any thing at all, provided it hath Air enough to breath in.

The reason why they can live so long without eating is doubtless that the pores of their skin being so exceeding narrow, as they do appear to be upon examination, very few of their Spirits do come to be lost; wherefore they have little need of successive nourishment to beget new ones, as other *Animals* have, who spend abundance of Spirits.

U u 2

Tis

How Vi-
pers differ
from other
Serpents.

'Tis good to take *Vipers* in the Spring, or Autumn, because then they are fattest and in greatest vigour. The Cold kills 'em. They differ from other Serpents in that they never grow so much; they have two Teeth on the sides of their Jaws, and those very long, in comparison with a great many little ones that are round about, and the Gumm of each of those long Teeth is full of a Yellowish Juice, in which many do think their venom consists; now Serpents have none of those long Teeth, but only little ones.

Again, They differ, in that being taken up by the Tails, they can't wind themselves like Serpents, to make such circumvolutions about the Arm, or thing that holds them, and this by reason of the different connexion of their *Vertebra's*.

Tongue of
the Viper.

When the *Viper* is irritated, it shoots out a forked Tongue, which looks like a little fire-brand, by reason of the vigorous motion of its Spirits; those who never had seen the Teeth of the *Viper* do think this is that which causes all the mischief, but the Tongue is not at all venomous. Some do save the Tongue, to wear about their neck instead of an Amulet, in order to preserve them from the effects of illairs. Serpents do likewise thrust out their Tongues as the *Viper* does. But here it may be good to advertise you by the by, That those things which are brought to us from *Maltha* for the Tongues of petrified Serpents are nothing but the Teeth of a Fish which that Country affords.

Amulet.

Counter-
feited

Tongues of
Serpents
from Mal-
tha, what.

Biting of a
Viper very
venomous.

The biting of *Vipers* is more dangerous than that of other Serpents, and the readiest remedy for it is, to press the wound hardly, that as much of the blood and infectious humour (as can be) may come out. Nay, it were good even

to

to suck it: and then to bind the Member a little above the Wound very fast with several Rolls of a Fillet to intercept the course of the *Vipers* Venome, which may otherwise spread through the whole Body. But if the part that is bitten cannot be tied, then bruise the head of the *Viper*, *Present Remedies for* and apply it to the Wound: or rather, heat a knife, or other flat piece of Iron red-hot, and hold it as near the Wound as the person can suffer it, or scarifie the Wound, and apply *Treacle*, or *Garlick*, or *Sal Armoniack*, bruised together, or else burn upon the Wound a little *Gunpowder*. All these Remedies may open the Pores of the Wound, and bring forth the invenom'd Spirits which are entered into it: But it is to be remembred. That all these sorts of Remedies are to be applied presently, as soon as the bite is received; for if you let any time pass before you apply them, they are altogether useles, because then the Venom passeth further into the vessels of the Body, and doth no more return to the Wound, how wide soever the Pores be made. If a piece of Iron be wanting, or if you cannot get it soon enough, take burning Coals instead of it: For it is here, as in the burning which is healed by holding the part to the fire as soon as it is burnt; for the great heat opens the Pores of the part that is burnt, and letteth forth the igneous particles, which entred into the flesh; whereas, if instead of heating the part affected, you let it cool, these same particles of Fire lodge themselves in the flesh, and do cause a pain for a long time.

After having made these necessary applications to the Wound of the person who is bitten, you must

U 4 3 n t

not fail to make him take often the volatile Salt of *Vipers*; for in case these external Remedies fail of their effect, this alone is capable to cure, by reason that being a volatile Alkali, it presently penetrates the vessels, and dissolves the blood, which the Venom of the *Viper* had congealed.

Different
opinions
concerning
the Venom
of *Vipers*;

Men are still divided in their opinions about the Nature of the Venom of *Vipers*. Most Men think this malignity consists in the enraged Spirits. And this is the opinion of *Van Helmont*, and *Poterius*, according to the relation of *Zwelfer* in his Remarks upon the *Augustan Dispensatory*, where he treats of the *Troches of Vipers*: He saith there have been a great many eminent Men who have confirmed this opinion with curious observations, on the bitings of enraged *Animals*, particularly of *Man*, of the *Cat*, *Wolf*, *Horse*, *Dog*, *Weasel*, &c. And among others *Fabritius Hildanus* in his *Chirurgical Operations*, to whose proofs he thinks nothing further can be added to confirm the truth of this opinion: If accidents, saith he, do happen that are sometimes more severe, and sometimes less, they must be attributed only to more or less provocation and anger, or sometimes to a more profound or lighter biting of these *Animals*. This opinion seems likewise to have been confirmed by some experiments, which *Monsieur Charas* relates in his *Book of Vipers*, where he shews not only that the enraged Spirits are the sole Poison of the *Viper*, but also pretends that the *Yellow Juice* which is found in the hollow part of the Jaw, wherein the great Tooth is fastned, and was supposed to be the Venom of this *Animal*, is no such matter; for having poured some of this liquor on the Wounds

Wounds of several Beasts, not one of them died, nay further, That those persons who had ventured to taste it, never found any inconvenience from it. Nevertheless Monsieur Redy in a particular Treatise on the *Viper* will not grant the truth of these Experiments.

On the contrary he maintains, That having put some of this *Yellow Juice* into the wounds of divers sorts of *Animals*, they soon died upon it, and thence concludes that the Venom of *Vipers* consists in the *Yellow Juice*, and not in the enraged Spirits only, as the others have thought, he taking this cause alone to be too Metaphysical. And in truth who would believe that the *Idea* which this *Animal* forms, when he finds himself provoked, should be able to imprint on the Spirits qualities so malignant?

Now in so great an opposition of Opinions and Experiments, a certain great Man of these times found a way to reconcile them, by affirming that the *Yellow Juice* of *Vipers* did produce different effects, according to the several places where these *Animals* lived; so that Monsieur Redy might have found the *Yellow Juice* to be venomous in *Italy*, whereas in *France*, where the Climate is not so hot, this *Juice* doth not produce any poisonous quality, unless it be quickned by the *Angry Spirits* of the *Viper*, which gives it a sufficient penetration.

Others do confidently assure us they have seen several *Animals* in *France* die, soon after they had put some of this *Yellow Liquor* into the wounds they had made for that purpose, which very much favours the assertion of Monsieur Redy.

Furthermore, As for what is related, that in France people have ventured to taste this *Yellow Liquor* without any harm, I find this not to be a convincing proof that it is no poison; for although *Spirit of Vitriol*, for example, or some other acid, does not prove mortal, when taken inwardly, nevertheless if the same quantity should be syringed into the veins, the *Animal* falls presently into Convulsions and dies. Now as that which caused the *Spirit of Vitriol* taken inwardly not to be Poison was this; the acids do become weak through the mixture of the *Saliva*, and before ever they come to mix in the mass of Blood, their parts do receive so great an alteration from the ferment of the places they must pass through, that they are able to do nothing else at most but cool the Body: so the same may be said of the *Yellow liquor* of the *Viper*, when it is tasted of, that besides its mixture, with the liquors of the mouth and stomach, it receives divers alterations from the Ferments of the places it must pass through, before it enters into the mass of Blood.

Many do likewise think that the Venom of *Vipers* hath its chief seat in the *Gall*, and thence is easily transported to the Gums, when they are angry; nevertheless in the Anatomy of this *Animal* there's no passage found capable of such a translocation. I know very well that the Pores of living Bodies may be said to be so open, that all manner of liquors may be presumed to pass through them, but yet no mischievous effect is discovered to proceed from the *Viper's Gall* when given inwardly, for it only causes sweat.

After having related the Opinions of others, it may not be amiss to shew my own. I conceive,
That

The Author's Sentiments.

That what they call the Venom of *Vipers* consists only in the abundance of acid volatile Salts, which this *Animal* throws out violently when it bites: And these Salts, passing into the Veins and Arteries, do coagulate the Blood, and hinder both its circulation and the course of the Animal Spirits, even as it happens when an acid liquor is syring'd into a Vein, which may be sufficient to explicate all the accidents which happen after the biting of the *Viper*, at least before a present remedy be brought.

First, The Person bitten waxeth Pale, and afterwards turneth Blue, because the Blood being partly fixed, the Veins and the Arteries do swell.

Account of the accidents which happen upon the biting of Vipers.

In the next place, he becomes Drowsie, Melancholy, uneasie, and has an intermitting Pulse, because the course of the Spirits being intercepted by the Coagulation in the vessels, the Blood circulates with difficulty.

Thirdly, He hath shiverings, Nausea's of stomach, Convulsive Motions, because the acid Salts, which are got into the Blood, and which sharpen it, do prick the internal membranes of the Veins and Arteries.

Fourthly, Death at last follows, because the Blood is still sharpening and congealing more and more, the passage of the Spirits is entirely stopp'd, and there can be no more circulation, without which none can live.

If after death you open the Veins of the dead body, you shall find some Blood more liquid than usual, and other Blood thick or curdled, which may be easily explicated; for when one part of the Blood curdles, it separates from the Serosity.

The

The difference that is between the effects of an acid liquor, syring'd into the Veins, and those of the Venom of *Vipers* is this, That an acid liquor, being immediately infused into a large vessel, fixes all the Blood of a sudden, and causeth strong Convulsions which are followed shortly after which death: Whereas the acid Salts which flow from the *Viper* when it bites, do not work so quickly; for besides that their acidity is not probably so strong as that of an acid liquor, they have a long passage before they come to the mass of Blood.

There is one circumstance which makes my application still more probable, which is, That the best Remedies which are used for destroying the Venom of *Vipers*, and for curing such as are wounded by them, are those which destroy acids, and dissolve the Coagulation of the Blood, as volatile alkali Salts drawn from *Animals*.

But to understand this matter more fully, it is fit to consider several things, as *First*, That *Vipers* are more filled with volatile Salts than any other *Animals*, and so not think it strange that they throw out much of it in their wrath. *Secondly*, That tho' these Salts turn Alkalies by distillation, they are acids in their own nature, before the fire works upon them, as I have said, when I spoke of the Principles. *Thirdly*, *Vipers* are covered with a very close and compact skin, whose Pores are shut, so that the Salts, which they contain, do circulate and subtilize much better, and do evaporate less than in other *Animals*. *Fourthly*, The shape of the *Viper* being long, freight and round, and almost like a small Gun, the Salts which they throw out in the biting

biting are driven with much more violence than if they came from a larger or more open place, even as Gun-powder has more force from a Pistol or Gun, than in a large Pot, or any other thing where it is not straitned. *Fifthly*, The two long Teeth of the *Viper*, which are its Arms, being straight and very sharp, they make deep wounds in the flesh, but which shut up so quickly, that the acid Salts, which enter there, and which mix with the Spirits of the Body, have no passage to come out: This is the reason why the part bitten swells presently, and if there be not Remedies quickly applied, they filtrate themselves into the constitution of the Body, and get into the large vessels, where they make that Coagulation I have mentioned.

All these reasons prove, That what they call the Venom of *Vipers*, poisons only by accident, and that while it resides in the *Animal*, it is no more to be esteemed poison than Vinegar, or such other like acid liquor, before it be syring'd into the Veins. And hence it is, That there is no Venom in a dead *Viper*.

But it may be objected, That if the Venom of *Vipers* proceeds from their volatile Salts, then the Salt of *Vipers*, which is given very successfully to those who have been bitten with this *Animal*, should encrease rather than cure the Malady, seeing by this means a greater quantity of these Salts are injected into the body. *Objection.*

But it is easie to answer this Objection; For *Answer.* first, The particles of volatile Salts, which flow from living *Vipers*, and which enter the flesh by the biting, are very different from those that are drawn by means of Fire from dead *Vipers*, which are

are taken at the mouth: The first are naturally pointed, acid, and coagulating; whereas the others have been blunted by the Fire, and rendered porous; they are Alkalies, and very rarefying, or dissolving, so that they are qualified to absorb, break, and destroy the first, as it always happens upon the rencounter of Acids and Alkalies.

In the second place, The volatile Salt of *Vipers*, which is taken at the mouth, has quite another determination than that which enters the flesh, and also it produceth a very different effect; for not being forced in its motion, it spreads every where, and dissolves the Coagulum which the other had made in the Blood.

I add further, That if any did swallow what a *Viper* throws out when it bites, and which is the cause of its Venom, they should not feel any other effect than what happens from several Salts and volatile acid Spirits, which are commonly taken inwardly for Remedies: you shall have a demonstration of this which I assert if you do but read the description of a sudorifick Water, drawn from living *Vipers* very much enraged in the *Balneum Mariæ*, which is at the end of my *Remarks* upon the distillation of *Vipers*.

As to the yellow Juice at the root of the long Teeth of the *Viper*, it is very probable, that it is only a *Saliva* for moistning and nourishing the Teeth: But as commonly there is some of it seen lying upon the Wound after the Bite, so it may very well happen, that a little of it may enter into the Wound, with the volatile Salt. Yea, perhaps, it is it self impregnated with an acid volatile Salt, and so is capable alone, when thrown out with such violence into the Bite,

Bite, to filtrate through the Flesh into the vessels, where it makes the Coagulations I have mention'd; For I do not alledge that the volatile Salts, which pass from the *Viper*, and which is all its Venom, have any dry consistency, for they are dissolved in some humidity to turn them into a Spirit, tho' in my explication I have only made mention of volatile Salts, because all the effect is from them.

It may be still objected, That if the Blood *Objection.* can be curdl'd by an acid volatile Salt of a *Viper*, which (as I have said) insinuates it self into the vessels of the Body, then the natural acidity of the Blood may sometimes occasion its curdling, as it happens in Milk, which curdles of it self, and this Coagulation may produce the same effects which the Venom of *Vipers* does. This *Objection.* Answer. creates no difficulty; for the Blood circulating naturally, its acidity is so well mixed, that it can never separate to make a *Coagulum*, no more than the acidity of Milk whilst it is in the Breast; for it is never seen to curdle there, except in some disease.

Moreover, Who doubts, but that some pestiferous Air, and divers Diseases which are caused by the corrupt humors of the Body, may coagulate the Blood, and produce the same effect as the Venom of *Vipers*.

The ancient Physicians believing that the Venom of *Vipers* was dispersed through the whole Body did advise us to whip these *Animals* in a warm Basin to drive their Venom into the extremities of the Body, before we cut (as is usually done) their *heads* two fingers below, and their *tails* two fingers above; after that, to

Troches of
Vipers,

off the skin, and take out the bowels, and then boil the body in water, wherein are added Salt and Dill, to correct, as they say, the remaining malignity. When the flesh is tender, it is to be separated from the bones, then to eight ounces of this flesh beaten into a paste in a marble Mortar are added two ounces of Bread dried and powdered, and *Troches* made of it, which being dried are kept for use.

But this long preparation is seldom used, since Experience hath taught us, that no part of a dead *Viper* is at all poisonous. The *Head* and *Tail* dried and powdered may be taken instead of a Cordial, as well as the rest of the body. I can likewise assure you, upon my own experience, that the *Tooth* of a dead *Viper* is no ways venomous, having by chance been prickt my self till the blood came, whilst I was a handling the heads of *Vipers* newly kill'd that I had a mind to dry, and there did not follow the least ill accident from it.

Furthermore by this Coction the *Vipers* flesh is deprived of its volatile Salts, which gave its greatest vertue; for they dissolve in the broth, which is flung away, and only the *Feces* remain, wherein there hardly rests so much Cordial vertue as there does in the bread which is mixed for a Corrective.

But there is no need I should enlarge my self further on this subject, because these *Observations* are sufficiently delivered in the *Augustan Pharmacopœia*.

Wherefore I do conceive it to be much better to use the *Powder of Vipers* newly made, than the *Troches*.

Powder of
Vipers,

To make this *Powder* well, it is good to chuse *Vipers*, when they are in the prime of their strength;

strength; The Females that are full of Eggs or young ones, are not so good as the others: Their heads are to be cut off, their skins thrown by, and their bowels taken out, and so they are set a drying in the shade, to be afterwards powdered in a Mortar.

But because this Powder is hard to keep, in that Worms do breed in it, it will be good to make it into a PASTE with a sufficient quantity of the mucilage of Gum Tragacanth, so form it into Troches, to dry them, and powder them when there is occasion to use them, and thus it keeps good a long time.

This Powder is given in the small Pox, Malignant Fevers, and all other Maladies where Alexipharmicks are required, and the humors are to be purified by Perspiration; The Dose is from eight grains to thirty in Broth, or some other convenient liquor.

The Heart and Liver are dried in the Sun, and powdered together, and this Powder called Animal Bezoar, hath the same vertues as the body of the Viper, only it is given in a little lesser dose.

The Gall of Vipers provokes Sweat; The Dose is a drop or two in Carduus water.

The fat that is found in them is melted, then strained for to separate it from the membranes it sticks to, it is as clear as Oil. Several Countries do use it in the Small Pox, and in Fevers: The Dose is from one drop to six in Broth, or some other convenient liquor. It likewise enters into the composition of some Plaisters, and into discutient Unguents.

Distillation

Distillation of Vipers.

THIS Operation is a separation of the phlegm, the volatile Salt, and the Oil of *Vipers* from its earth.

Take twelve dozen of *Vipers* dried in the shade, as I said before, put them into an earthen Retort, or glass one coated, place it in a Reverberatory furnace, fit to it a great capacious Receiver, and luting the joints close, begin the distillation with a small fire to warm the Retort gently, and drive out a phlegmatick water drop by drop; when you see no more drops to fall, encrease the fire a little, and *Spirits* will come forth, which will fill the Receiver with white Clouds, you will see at last a black Oil come, and the volatile Salt stick to the sides of the Receiver. Continue the fire until there comes no more, after which let the vessels cool, and unlute them. Shake about the Receiver a little, to loosen the volatile Salt from the sides, and pour it all into a Bolt-head, fit to it a head and a small Receiver, and lute the joints with a wet bladder; you must set your vessel in Sand, and with a gentle fire under it, the volatile Salt will sublime, and stick to the head, and uppermost part of the Bolt-head, separate it and keep it in a viol well stopd.

*Volatile
Salt of
Vipers.*

Virtue. It is one of the best Medicines we have in Physick, it is good in Malignant Fevers, and Agues, the Pox, Apoplexy, Epilepsie, Pallie, Hysterical Maladies, and the bitings of all venomous Beasts;
Dose. The Dose is from six to sixteen grains in some proper Liquor.

Pour

Pour that which remains in the Bolt-head into a Tunnel lined with brown Paper, the Spirit and phlegm will pass through, and the stinking Oil remain behind; Hysterical Women may smell to this last, to allay vapours, and Paralytical parts may be anointed therewith; but its sinell is so offensive that it is hard to endure it.

Oil of Vipers and its Vertue.

Pour the Spirit and Phlegm mixed confusedly together into an Alembick, and distil in a vaporious Bath about half the liquor, you'll have a Spirit that must be kept well stoppt, it hath the same vertues as the Salt: The Dose is from ten to thirty drops.

Spirit of Vipers.

Dose.

The Phlegm must be flung away.

If that which remains in the Retort is calcined in an open fire, and a *Lixivium* made of it, as I said concerning fixt Alkali Salts, a small quantity of fixt Salt will remain, which nevertheless hath no more vertue than other Alkali Salts I spoke of before.

Fixt Salt.

The volatile Salts of Toads, Ivory, Harts-horn, the Blood, Skull, Nails, Hair, and other parts of Animals may be drawn after the same manner.

Different volatile Salts.

Remarks.

The Receiver must be sure to be large enough, that the Spirits may circulate with greater ease, the fire must likewise be well managed; for these Spirits being forced out too fast do rush forth violently, and break the Receiver, or else are lost through the joints.

The Phlegm comes before the other Principles in the first distillation, but in the Rectification the volatile Salt rises first, because it is at liberty, and is lighter than the Phlegm.

X x

The

The Spirit which is drawn from Animals by Chymistry is nothing but a volatile Salt dissolved in Phlegm.

Your vessel for sublimation must be very high, that the volatile Salt may rise without any Phlegm; but when the vessel is short, the Phlegm riseth with the volatile Salt, liquifies it, and turns it into Spirits. A Bolt-head, or a long body with its head, may serve for this Operation, because the Phlegm being too heavy cannot mount so high, and therefore leaves the volatile Salt to sublime alone, which may nevertheless be rectified to become more pure; you must mix it with the distilled Spirit, and repeat the sublimation according as I have said: But because this Salt always carries along with it a small quantity of Oil, a few days afterwards it loses its whiteness, and turns Yellowish: Now to avoid that, you must pour upon it, when it is in the bottle, *Spirit of Wine Tartarized* one fingers height, and so keep it well stopp'd. This *Spirit of Wine* hinders the Salt from dissolving it self and the Oil it contained, so that after some days it turns red, and the Salt grows white; when it is to be used, the Spirit is decanted from it, and the Salt left alone: By means of this Lotion it loses a little of its former smell; but care must be taken that the *Spirit of Wine* be well rectified, for if there remained any the least Phlegm, the Salt would dissolve in it. You may also sublime it again as before, after having well wash it in *Spirit of Wine*, it will be dry, and very fair.

There is another way of rectifying the volatile Salt, which is by mixing it with four or five times as much bones, or horns burnt white, and putting the mixture into a glass, or earthen body, then sitting

fitting to it a Blind-head, or such a one whose Nose has not been opened, after that luting well the joints, then setting the vessel in Sand, and with a gentle fire the volatile Salt will rise, and stick to the head, you must continue the fire until there arises no more.

This Salt is hereby purified from a great deal of its Oil, which remains in the powder of Bones; wherefore it becomes whiter than it was, and pleasanter to the Palate. It may again be mixt with other calcined Bones, and sublimed as before, to render it purer still, and take away more of its loathsome smell, that's caused partly by the *Empyreumatical Oil* that it draws along with it in the distillation.

I cannot approve the method of some, who to take away the strong odour from volatile Salt, mix them with the Spirit of Salt before they rectifie them: For this Spirit fixes these Salts somewhat, and by its acidity destroys their Alkali quality, and so diminisheth their Vertue, which should rarefie the gross humors, expel them through the Pores, and destroy the acids, which are in too great quantity in the body.

The volatile Salt dissolved in a little water Crystallizes like Sugar-Candy, and then it is easier to keep than before.

*Volatile
Salt Cry-
stallized.*

There can be drawn from *Animals* but a very little quantity of fixt Salt, because the Spirits which abound in them do volatilize their Salt: for which reason this volatile Salt keeps dry longer than that of *Vegetables*.

The vertue of *Animals* doth principally consist in their volatile Salt, it is that which gives Meat its savour, that makes Broths strong, and turns

X x 2

them

them into a Gelly, according as they do abound more or less. The *Juscula Consummata* which are made with a small fire are better than those that are boiled quick, because a strong fire carries away good part of the volatile Salts.

Volatile Salts do rarefie the humors of the body, both by reason of their piercing nature, and also in that being Alkalies they do dull the strength of Acids, which keep the humors condensed, after which the blood being in greater motion than before, doth the more easily purifie it self, either by perspiration or by Urine, from heterogeneous Bodies which were there gathered together.

This Operation may serve to shew how the volatile Salt of all *Animals*, or any part of them, may be drawn. When the volatile Salt of Blood is to be drawn, that of the best colour must be taken and dried in the Sun, or else with a very little fire, and so distilled like *Vipers*.

What quantity may be distilled from Vipers.

From sixteen ounces of *Vipers* there may be drawn by distillation ten ounces two drachms of a liquor and volatile Salt, and there will remain in the Retort five ounces two drachms of a black matter.

From Harts-horn.

Afterwards, by rectification there may be drawn an ounce and six drachms of a volatile Salt, two ounces and three drachms of black Oil, three ounces of Spirit, and as much Phlegm.

If you distil two and thirty ounces of shavings of *Harts-horn*, you'll draw thirteen ounces of liquor, and volatile Salt, and there will remain in the Retort nineteen ounces of matter as black as Coal.

You'll draw from the liquor an ounce and a half of volatile Salt, six ounces of Spirit, and two ounces of black Oil.

The

The black matter being grinded on a Marble is good for *Painters* use; if you calcine it, the fuliginous parts which make it black, will fly away and leave the *Harts-horn* very white; you'll have sixteen ounces of it, and this is called *burnt Harts-horn*. It is accounted a Cordial, but indeed has no other vertue than to destroy acids, as all other alkali matters do.

Some do stratifie *Harts-horn* with *Bricks*, and calcining it that way, they call it *Harts-horn* prepared *Philosophically*; they account it more Cordial than it was before; but they are egregiously mistaken, for the volatile Salt and Oil, which were the things that should render it *Cardiacal*, were carried away in the *Calcination*, and there remains only a *Terrestrious* matter that may be called a *Caput mortuum*. Notwithstanding it is an Alkali, which may serve as *Crabs-eyes*, *Coral*, and divers other matters of the like nature, which absorb acids; the *Bricks* bestow no vertue at all to it.

If you distil forty ounces of *Ivory*, you will draw thirteen ounces of liquor, and volatile Salt; and there will remain in the Retort six and twenty ounces of a matter as black as Coal.

Afterwards by the Rectification you will get two ounces and a drachm of volatile Salt, one ounce and five drachms of a stinking black Oil, five ounces of Spirit, and four ounces two drachms of Phlegm.

If you calcine the black pieces which remain in the Retort, in an open fire, the soot will leave them and they will burn white; this is called burnt Ivory, or *Spodium*: It has the same vertues as *burnt Harts-horn*, you'll have at least twenty ounces of it.

X x 3

It

It is here remarkable that *Ivory* does contain much more earth than *Harts-horn*, and doubtless that is the reason why it is the whiter.

From Hair. If you distil twelve ounces of *Hair*, you will obtain eight ounces of liquor and volatile Salt. There will remain in the Retort three ounces and a half of a black matter very spongy and earthy, from which no fixed Salt can be drawn.

And by Rectification you will raise into the Head an ounce and seven drachms of a very fine volatile Salt; separate by a filter three ounces of a black and very fetid Oil, and by distillation of that which is filtrated you'll have two ounces of Spirit, and nine drachms of Phlegm.

All volatile Salts have much resemblance in their figure, smell and taste, but that of *Vipers* is accounted the most active, and proper against Poisons: Those of *Harts-horn*, and *Man's Skull* are thought to be better than others for the Epilepsie, that of *Man's Blood* to purifie the Blood, and so of the rest.

Some imagine, That the volatile Salts represent the figure of the parts from which they are drawn. Thus the volatile Salt of *Harts-horn* shews in the Receiver the figure of Horns, volatile Salts, of Blood and Urine, Veins and Arteries; and that of *Hair*, the resemblance of Hair, and so of the rest. But experience doth not much confirm this: For tho' we perceive in the Receivers, Figures, yet we cannot observe these nice differences; it is too much refining to make distinctions of this Nature.

When you rectifie the Spirit of *Vipers*, or *Man's Skull*, or *Harts-horn*, or *Hair*, in order to purifie them from their Phlegm, if you should let the liquor

quor continue distilling longer than is fitting, the Phlegm will rise after the Spirit, but then it separates from the Spirit as Water separates from Oil, the Spirit will be uppermost, and a little troubled and whitish, but if you keep these two liquors together for a Month, the whole will mix together, and there will be no longer any separation of them at all.

These effects do happen from this, That the Spirit in rising does carry with it some small quantity of Oil, which was dissolv'd in the liquor by reason of Salts that it contains. This Oil is very volatile, it rises with the Spirit, and by rendring the Spirit a little oily, it hinders at first the Phlegm from mixing with it. It is likewise this little quantity of Oil which makes the Spirit look a little troubled, and whitish; but when the Spirit and Phlegm are kept a good while together, they mix, and the whole appears like a homogeneous liquor, because there being but little Oil in the Spirit, the Phlegm insensibly enters into, and incorporates with it; wherefore you must take care to separate the Spirit from the Phlegm so soon as ever you take the Receiver from the nose of the head, in case you have suffered the liquor to distil too long.

What I have now spoken of does not happen in the Rectification of the *Spirit of Ivory*, and without doubt the reason is that the *Ivory* does not contain so much Oil as the other parts of *Animals*.

Some do prepare a *Sudorifick Water* with *Vipers* after this manner.

They do put the *Vipers* alive into a great earthen body, they fit to it a head with its Receiver, they lute the joints, and distil in a *Balneum* all that

X x 4

will

will rise from it; but you must take care that the head be well fastned to the body, for when the *Vipers* begin to be heated, they leap and sling about with so much violence, that they would otherwise throw it down, and get out of their stove. And then the Artist must have a care of himself, and not be too bold, for these creatures being irritated would sling about on every side, and a bite of theirs at that time would be twice as dangerous as at another.

Verm. This Water which rises whilst the *Vipers* are in their greatest fury is *Sudorifick*, because some volatile Salts have risen and mixed with it. You may give of it from a drachm to half an ounce in some proper liquor.

Def. But to avoid the forementioned danger you might cut the *Vipers* in pieces before you put them into the body; and because these pieces of them do retain life a long time, the water will be little the worse for their not being intire.

When you have drawn as much water from them as you can, by the heat of a *Balneum*, you must put the remainder of the *Vipers* into a *Retort*, and distil it as I have shewn before; you will thereby have the *Volatile Salt*, the *Spirit*, and the *Oil*.

CHAP.

CHAP. II.

Distillation of Urine, and its Volatile Salt.

THIS Operation is a separation of the *Spirit*, the *Volatile Salt*, and the *Oil of Urine*, from the Phlegm, and the earth which it contains.

Take ten or twelve quarts of *Urine* newly made by sound young men, evaporate it in an earthen or glass Cucurbit in a Sand-heat, until it remains in the consistence of Honey; then fit a head with its Receiver, and luting the junctures close, continue a small fire to distil the rest of the Phlegm, after which encrease it by little and little, and the Spirits will rise in Clouds, carrying with them a little *Oil*, and after that the *volatile Salt*, which will stick to the head like Butter-flies; continue the fire until there comes no more; then unlute the vessels, and separating the *volatile Salt*, put it into a Bolt-head, pour likewise into it the Spirit that is in the Receiver, and fit a blind-head to the Bolt-head; lute the junctures with a wet bladder, and setting your Bolt-head in Sand, sublime with a small fire all the *volatile Salt*, as I have shewed concerning that of *Vipers*; separate this Salt, and keep it in a Viol well stoppt. It is a good Remedy *Vertue.* for Quartan Agues, and Malignant Fevers, it opens all Obstructions, and works both by *Urine* and Sweat: The Dose is from six to sixteen grains *Dose.*
in

in some convenient liquor; filtrate that which remains in the Bolt-head, the Spirit will pass through the Filter, whilst a small quantity of black and extraordinary stinking Oil remains, which is good to discuss cold Tumors, and to give to Hysterical Women to smell to.

Spirit of Urine.

You may distil the Spirit in a Sand-heat to separate it from a thick matter that remains at bottom, it hath the same vertues as the Salt; it is given from eight to twenty drops in some proper vehicle.

Dose

Vertue.

Two drachms of it are mixed with two ounces of *Spirit of Wine* to rub Paralytical parts with; it is likewise used for cold pains, and for the *Sciatica*.

Fixt Salt.

If the Mass that remains in the Cucurbit should be calcined, and a *Lixivium* made of it with water, a very small quantity of fixt Alkali Salt might be gotten from evaporating the water, and it hath the same vertues as other Alkali Salts.

Remarks.

The *Urine* of Young men is to be preferr'd before others, because it contains more Salt. It must be newly made, and evaporated with a gentle fire, that the Fermentation, or too much heat, may not cause the *volatile Salts* to rise with the Phlegm. The *Spirit* is only a *volatile Salt* dissolved in a little Phlegm; this *volatile Salt* works more by *Urine* than any of the rest, but its smell is more offensive.

The *volatile Salt*, as I have described it, may be drawn more easily, and in greater quantity in Winter.

Winter than in Summer, because in hot seasons there is a Fermentation in the *Urine* as soon as it is made, and the greatest part of the *volatile Salt* dissipates with the *Phlegm*, whatever care be used to keep it: But in Winter, the cold concentrates the *volatile Salt*, and makes the *Phlegm* to separate very easily.

Volatile Salt of Urine easier made in Winter than Summer.

This Remedy must never be given in Broth, for Broth being to be taken hot, the heat evaporates some of the *volatile Salts*, before it can well be taken.

A *volatile Salt* may be drawn from *Urine*, after setting it some months fermenting in a Vessel closestoppt, and then a third part of the Liquor must be distilled with a gentle fire; it is in this distilled *Urine*, that the *volatile Salt* will be found exalted by the Fermentation. Rectifie this liquor again three or four times, throwing away each distillation the *Phlegm* that remains at the bottom of the Cucurbit; then putting your *Spirit of Urine* into a Matrafs with its head, sublime the *volatile Salt* as I shewed before. Some do add to it *Salt-peter*.

Another method of drawing volatile Salt from Urine.

This *Salt* is of a more penetrating nature than the other, but a great deal of time is required to make it.

The *Spirit of Urine* may also be drawn without fire, by putting the *Urine* when evaporated into the consistence of a Syrup into an earthen or glass Cucurbit, and adding to it *Quick-lime*: For if you fit a Head and Receiver, and lute the junctures carefully with a wet bladder, the *Lime* will heat the *Urine*, and there will be still a *Spirit* in the Receiver, which hath the same vertue as the former: It will also be somewhat more

Spirit of Urine without fire.

subtile,

subtile because the igneous particles of the *Lime* are entered into it.

The Phosphorus.

IT is a luminous matter distilled from *Urine* that has been fermented.

Take a good quantity of *Urine* newly made by those who commonly drink *Beer*, evaporate the humidity by a slow fire in earthen Vessels until it comes to the consistence of an Extract or thick Honey. Put all the matter together in an earthen Pot, set it in a Cellar, cover it, and leave it there for three or four months, that it may ferment and corrupt.

Take two pounds of this fermented matter, mix it with a double quantity of Sand, or of Bole powdered, put this mixture into a large Retort of glass or Earth, set it upon a naked fire in a reverberatory Furnace, fit to it a large Receiver of glass, which has a long neck, and into which you have put three or four pints of common water. Lute carefully the junctures, and add a small fire to the Retort for about two hours, only to heat it insensibly, and to distil the Spirit of *Urine*, but afterwards augment the fire by degrees, there will distil a volatile Salt, and a quantity of black stinking Oil. Increase the fire to the highest degree, and there will appear in the Receiver white clouds, one part of which will fix by little and little to the sides of the Receiver, in form of a yellow skin, and another part will precipitate to the bottom in powder. Continue a violent fire for three hours until

until there distills no more from the Retort.

Let the Vessels grow cold, then unlute them, throw water into the Receiver, and having shook it sufficiently about to loosen that which was glu'd to its sides, pour it all into a large glass Vessel, and leave it to settle, the volatile Salt will dissolve in the water, but the matter of the *Phosphorus*, and the Oil will precipitate, to the bottom; decant the water, and having gathered the matter together, put it into a little glass Vessel, add to it a little water, and place the Vessel in Sand, give it a digestive heat, and stir the matter gently with a wooden Spatule, the *Phosphorus* will separate from the Oil, and sink to the bottom, you may make it up into little sticks whilst it is hot, by putting of it into the neck of a very little Bolt-head, and taking it out when it is cold, then keep it stop'd in a little Bottle fill'd with water, for without water to preserve it, it would spend it self and be lost in fumes.

To make the *PHOSPHORUS* liquid, you must scrape or break off a piece of it, put it into a Viol, and pour upon it the clear *Essence of Cloves* to the height of one finger, stop the Viol close, and set it two days in digestion in horse-dung, stirring it from time to time, to help the solution of the matter, after that take your Viol and keep it, you have in it the liquid *PHOSPHORUS*. All the matter will not have dissolved, some part of it will remain at bottom.

Both the solid and liquid *Phosphorus* shine in the dark when the air is let in to them.

Remarks.

Remarks.

Etymology.

The word *Phosphorus*, comes from the Greek *Φωσφορος*, that is, *Lucifer*, or the Morning Star.

Different kinds.

Of them there are the Natural, and the Artificial; the Natural are such as *Glow-worms*, *Rotten Wood*, and many others. The Artificial are made with the *Bolonian Stone*, with chalk, with Urine, with Blood, and with divers other fulphureous matters.

Authors of the Phosphorus.

A certain Alchymist of Hamburg, his name was *Brand*, making experiments upon Urine to find out the *Philosopher's Stone*, with which his head was madly taken up, did discover by chance the *Phosphorus*, in the Year, 1669. But he did not communicate the way of making it to any person, and so the secret died with him. After his death *Kirckelius* a Chymist belonging to the Elector of Saxony set himself to find it out, and did succeed: He was not so reserv'd as *Brand* had been, for he generously shewed his discovery to several of his friends.

About the Year, 1680. The Illustrious Mr. *Bail* having learned it of *Daniel Kraff*, a German, made it publick, in an excellent Treatise, which he entituled, *Noctiluca Aerea*. But since that time, Monsieur *Houberg*, a German, who had seen the same Author do it, hath described it at *Paris*, with a great number of curious Remarks, which may be found in the *Memoirs* of the Royal Academy of Sciences for the Months of April and May, 1692. And being a Member of the same Academy, he made it there before them.

Seeing

Seeing the design is to retain the Saline and Sulphureous parts of the *Urine*, it is necessary that it be fresh when it is evaporated, that the Phlegm alone may pass away; for if it has had time to ferment, both the volatile Salt and some parts of the Oil will exalt, and go off with the Phlegm in the evaporation.

When the *Urine* upon evaporation begins to grow thick, you must take care that the matter does not swell over the Vessel, for it rarefies very much: For then the lightest part will spread through all, whereas the grossest is most necessary for making the *Phosphorus*.

The thick matter remains black in earthen Vessels: It is put into a covered Pot, and set in a Cellar, where it is left to stand a long time, that the Principles may be exalted by Fermentation.

There is a good quantity of Sand, or Bole in powder, that the parts being divided and rarefied by this mixture, the fire may make the greater impression upon them, and so separate the *Phosphorus*, which is contained in the most fixed part, and which therefore is not so easie to be separated otherwise.

It is requisite, That the Receiver have a long Neck, which may set it at some distance from the Furnace, that it may not be too much heated; for much heat hinders the white Clouds, which are the substance of the *Phosphorus*, to thicken soon. The capacity also of the Vessel must be large; for if the vapours have not room enough to circulate, they will crack all.

The water, which is put into the Receiver, before it be adapted to the Retort, serves to condense

condense and quench the *Phosphorus* which falls to the bottom.

It is necessary to use a gentle fire at the first, not only for heating the Retort insensibly, which would crack and break by a sudden great heat, but also for distilling gently the humid parts of the matter, which would rise up like Honey, if it were agitated violently in the first distillation. But there is not any reason to fear the like accident towards the end of the Operation, because then the matter being dried and hardened in the Retort, it cannot raise it self any more.

After the Operation is ended, you must cool the Vessels all of a sudden before you take away the Receiver, for if the Air be let in while it is hot, the *Phosphorus* will take fire.

The Oil which is separated from the *Phosphorus* at the end of the Operation is a little luminous, but it is very fetid; there is but little of it, because some part of it has been rarefied by the fire, and turned into *Phosphorus*.

It is observed, That those who commonly drink Wine, their Urine doth scarce afford any *Phosphorus*, probably because the Wine being spirituous, its luminous matter doth very easily evaporate; for a viscous substance is necessary to retain it, like that of Ale or Beer: Hence it is, That they succeed in this Operation in *England*, *Flanders* and *Germany*, much better than in *France*.

The *Phosphorus* contains more Sulphur than any thing else, for Water condenses it, and Oils dissolve it; it has an offensive smell, and it is partly to correct the smell that it is dissolved in Oil of Cloves, when we make it liquid.

The

Urine of
those who
drink Beer
is better
for the
*Phospho-
rus*, than
that of those
who drink
Wine.

The *Phos-
phorus* con-
tains much
Sulphur.

The liquid *Phosphorus* gives more light at first than the solid, because its matter is more rarefied. ^{Effects of the liquid Phosphorus.} Open but the Bottle in the dark, and it appears to be all of a fire. You might use Oil of *Cinnamon* instead of Oil of *Cloves*, and the light would be still the greater, because the parts of Essence of *Cinnamon* are more volatile than those of the Essence of *Cloves*, but it would endure the less time for the same reason. Add to this, that the Oil of *Cinnamon* is a very dear commodity.

The pure Oil of *Turpentin* dissolves the *Phosphorus* entirely, and in less time than any other Oils: ^{Oil of Turpentin dissolves the Phosphorus entirely.} The reason without doubt is its acid and subtile Salt, which penetrates the Salt of the *Phosphorus* that is Alkaline, while the Oil impregnates with the fat part; for a small ebullition may be perceived during the dissolution. The Liquor is luminous as the rest, but it has a bad smell.

If you put a small piece of *Phosphorus* into a ^{Experiment} Viol, with a little of the Oil of *Vitriol*, well dephlegmated, that it may be very strong, and afterwards add to it about half the quantity of common water, then stir the Viol, the mixture will become very hot and smoak, and the *Phosphorus* will be reduced to powder in the bottom of the Vessel.

If you make this Operation in the dark, you shall see the *Phosphorus* lighted by the heat of the liquor, and sparkle in several places of the glass like Diamonds. When the liquor is cooled, it doth the same when you stir the Viol, but a little more weakly.

When I treated of the Oil of *Vitriol*, I gave a ^{Explication} reason why it turns hot when it is mixed with of the ^{Experiments} water: And the more it is dephlegmated it still gives

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gives

gives the more heat: The *Phosphorus*, which is kindled by the heat, adds somewhat more to it, which is the cause of the light. But seeing the *Phosphorus* is partly fixed by the *Oil of Vitriol*, the luminous matter cannot exalt it self but with a kind of violence, which is the cause of the sparkling.

The *Phosphorus* mixeth with *Mercury*, and makes a luminous *Amalgam*, as followeth.

Luminis Amalgam. Put into a long Viol ten grains of *Phosphorus*, pour upon it two drachms. of the *Oil of Aspike*. The Viol must be so large, that two thirds at least may be empty: Heat it a little with a Candle, the *Phosphorus* will dissolve with the ebullition: and during the dissolution pour into it half a drachm of pure *Quicksilver*, shake the Viol, that the matter within may be stirred and mixed, and you shall have an *Amalgam*, which will appear all of a fire in the dark.

The cause of this Amalgamation is, That the *Mercury* doth mix and incorporate it self with the fat and sulphurous parts of the *Phosphorus* while it mixeth and unites with the *Oil* with which it is agitated.

Another Experiment. *Camphire* doth obstruct the light of the *Phosphorus* when it is mixed with it, which is very strange, seeing this mixture is almost all volatile *Sulphur*, which one would think very agreeable to the nature of the *Phosphorus*: But it seems there is in *Camphire* some kind of Salt, which fixes the *Sulphur*, and hinders it from taking fire.

Another Experiment. If you should fire a little piece of the solid *Phosphorus* with a Burning-glass, and quench it when two thirds of the quantity are consumed,

that which remains will be yellow, and a little luminous still; it will easily dissolve in water. This Experiment shews, that the more fixed part of the *Phosphorus* is saline, because it dissolves in water.

The *Phosphorus* is luminous in the dark at all times, but especially in hot weather; for the cold does a little constringe the parts. If you take a little piece of the solid, or even the stopple of the bottle that contains the liquid, and write with it on Paper, or upon the hand of a person, the letters do seem to be a perfect fire. Another Experiment

You may also mix carefully a little *Phosphorus* with a good quantity of *Pomatum*, and anoint such parts of the body with it, as you would have to appear luminous, without any danger; for the burning particles of the *Phosphorus* are tempered by the *Pomatum*. Another Experiment

If you rub a little piece of the solid *Phosphorus* on Paper, and press it down with the point of a knife, the Paper will be set on fire. Another Experiment

After some Experiments made one day at my house upon the *Phosphorus*, a little piece of it being left negligently upon the Table in my Chamber, the Maid making the Bed took it up in the bed-clothes she had put upon the Table, not seeing the little piece: The Person who lay afterwards in the Bed, waking at night, perhaps through the more than ordinary heat he felt, perceived that the coverlid was on fire. It seems the *Phosphorus* being heated with the Body of him that lay in Bed had set fire to the coverlid, and had before he perceived it burnt a great hole in it.

It is observable, That the air lighting the fire by exciting the motion of parts in the *Phosphorus*, The air causes the Phosphorus to shine

does likewise make it yield a considerable light; for when the matter has continued shut some time in the glass, it shines no longer, and it recovers its light no more until the glass is opened, and the air is let into it.

Experiments made
by Monsieur
d'Alence.

Nevertheless some Experiments made a while since in *Paris*, at the house of Monsieur d'Alence, by Mr. *Homborg* a *German*, do seem to evince the contrary, that the air is not always necessary to make the *Phosphorus* shine in the dark.

The case was thus: A very little piece of the solid *Phosphorus* was put into a light glass Bottle; a brass cock was fitted to this Bottle, and made so as it could enter into another cock belonging to a large glass Receiver. Then the Bottle that contained the *Phosphorus* was heated, and the cock of this Bottle was made to enter into that of the great glass vessel, out of which the air had been pumped. So soon as the cocks were opened, the air came forth of the little bottle, and at the same time was seen to come a great train of light like a flash; nay some did discover particles of the *Phosphorus* at the bottom of the great glass.

The Bottle was then taken from the Receiver, and the light of the *Phosphorus* was very much diminished: It sometimes seemed to be quite out, the cock was turned to let in the air, and presently the *Phosphorus* recovered its light again.

In the mean time the heat of the *Phosphorus* grew less and less, and it yielded but a weak light. We began the Experiment again, the same bottle that had the *Phosphorus* was applied to the great glass Receiver, and when the air was drawn out of the bottle, the *Phosphorus* did shine brighter; on the contrary when we let the air again into it,

the *Phosphorus* went out : which is quite different from what hapned whilst the bottle that held the *Phosphorus* was hot in the former Experiment.

We repeated the Experiments divers times, and saw the same thing continually happen : that is to say, The *Phosphorus* being heated lost much of its light, when the air was pumped out of the bottle wherein it was contained, and it recovered light again when new air was let into it : on the contrary the *Phosphorus* being cold did shine when the air was pumped out of the bottle, and the light disappeared when the air was let into it.

It suffices to have related two Experiments, as contrary one to another as can be, it is easie to judge what would happen when the *Phosphorus* is not so hot as in the first Experiment, and when it is not altogether so cold as in the second, the alteration of the least circumstance quite alters the Experiment, but the same things always happen in proportion with those already described.

We made another Experiment thus: We put a ^{Another} little piece of the solid *Phosphorus* into a crystal ^{Experiment} vessel, and we poured upon it a very fixt acid liquor, I think it was *Oil of Vitriol*, a great fume arose from the mixture; we stopt the bottle with Paper, and stirred the matter several times after having left it some hours in digestion. We lookt upon it in the dark, and it appeared luminous, though it were stopt, and it has still been alike luminous for many Months. Indeed the light of it is not so great as is that of the *Phosphorus*, but it keeps a much longer time.

That which is surprizing in these Experiments is, That the air does sometimes make the *Phosphorus* shine, and sometimes not. Now to explicate ^{Remark upon the former Experiment.} this

this difficulty, I do say, That in the first Experiment the greatest part of the luminous matter of the *Phosphorus* did fly out of the bottle into the Receiver, and that that which remained in the bottle after it was separated from the Receiver, being deprived of its most subtle sulphur, was not able to give so great a light as before: nevertheless the matter still retaining a little warmth, there did rise from it particles enough to give a light when the bottle was unstopt; but because by the cold the little bodies do condense, and lose very much of their motion, this *Phosphorus* likewise loseth much of its strength, and gives but a languid or weak light.

When the air was drawn out of the bottle, the matter lookt very light, and when the air was let to it again, it went out, the reason whereof is that the light being weak, could not preserve itself but with a convenient proportion of air, and there was some remaining still in the bottle: for though the air be never so much pump'd out of the vessel, there will still remain a little behind. The *Phosphorus* loses its light by the usual great quantity of air, as a little candle will be put out by being exposed to the wide air, or a small fire will soon go out, when too great a wind blows strongly upon it. So long as the *Phosphorus* sends forth a great many vapours, a good deal of air is requisite to make it appear luminous, and a little air will not be sufficient. Wherefore when the *Phosphorus* was hot, it would not shine, until the bottle was unstopt, but when it was cold, it sent forth only weak vapours, wherefore then a very little air sufficed to make it shine, and when it received too much, it was thereby suffocated.

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The last Experiment made in the little Crystal Bottle does further very well prove my explication: The fixt acid liquor which was poured upon the *Phosphorus*, did slacken the motion of its parts, so that from that time they could not display their light with so much vigour as they did; wherefore a very little sufficed to continue its light, so that the paper-stopple served to give it sufficient Air; but when the Bottle was stopt closely with its Crystal stopple, no more light was seen for some time afterwards, because that stopple did wholly hinder the entrance of air. It is likewise the fixing of the Volatile parts of the *Phosphorus*, which preserves the light so long, for the matter having now less motion than before it was fixed, its parts do come to be dissipated with the more leisure.

But you will tell me, That the great fume which exhaled from it when the acid liquor was poured upon the *Phosphorus*, is rather a sign of a greater than less dissipation of parts. *Objection.*

I grant that when this acid acts upon the matter there is at that time a considerable exaltation of parts: but I say also that when this great motion is once over, that which remains is in much less agitation than it was, and you must observe that the strong acids, such as *Oil of Vitriol*, and *Spirit of Nitre* upon being mixed with *Spirit of Wine* do cause a much like fume as this, and yet afterwards the *Spirit of Wine* is much less volatile than it was. *Answer.*

Again the light of the *Phosphorus* which is in the little Crystal Bottle that is stopt, may be said to be partly caused by an Air which is produced by a kind of fermentation: for doubtless

there is some little action between the acid and the matter.

I find therefore that there is a parity of reason in the explication of the light which appeared in the Viol after the Air was pump'd out of it, and that which is seen in the little Crystal Bottle stop'd.

It is further remarkable that this same *Phosphorus* which went quite out, when Air was let into it by means of the Pneumatick Engine, yet did not altogether lose its light when it received the Air the common way, that is to say, meerly by unstopping the Bottle, whereof the reason is this, the Air that is communicated from the Air-pump comes in with a greater force and violence through the Pipe, and so may very well put out the light of the *Phosphorus*, which the Air that has its ordinary motion is not able to do; after the same manner as a Candle lighted is much sooner put out when exposed to a blast of wind, than when it is set in a place where the Air is quiet.

From considering all the kinds of *Phosphorus* both Natural and Artificial, and the Experiments that have been made upon them, I cannot but conclude that the general cause of the light they give does proceed from a very great agitation of insensible parts; and whereas it is very probable that fire is only a very violent motion of little bodies round their center, the parts of our *Phosphorus* may be said to have received the same determination by the fermentations it hath undergone; for *Wood* never shines in the dark until it becomes rotten, that is to say, until it has undergone a sufficient fermentation to make its most subtile parts move round their center. The *Bolonian-stone* is not luminous until it has been calcined a certain

certain time, in order to excite a motion of its parts. A *Cat* is not luminous throughout the whole body, but if you rub its back roughly against the hair, in the night, it will shine, because this irritates the Animal, and determines the Spirits to move much more strongly than otherwise they would do. We may also say, That the Eyes of a *Cat* are a kind of *Phosphorus*.

The *Viper* being irritated darts forth its Tongue with so much quickness, that it appears all on fire. Many little creatures, such as some kinds of *Caterpillars*, and *Woodlice* do shine in the night, because they have a matter so exceeding subtile towards their Tail, that it produces a sort of fire; and it is for the same reason of the motion of parts that *Urine* does become luminous.

That which gave occasion to the working upon *Urine* for the making of the *Phosphorus* was, That in some little holes of the earth wherein there had been standing-puddles of *Urine*, a light had been observed to be seen at nights.

But you will ask me then, Why the greatest part of mixt bodies do yield no light, although the same means are used to excite a motion of their parts. *Objection.*

I answer, That all mixt bodies have not their insensible parts so disposed to a rapid motion, and after such a manner as those I have now spoken of. Wood indeed will easily enough flame, but you can't make a flame with stones, because you cannot give stones the same determination to motion of parts, as you can to Wood. To give light, or to make a fire, bodies must be compounded of sulphureous parts, for sulphurs are very susceptible of motion. *Answer.*

I do

I do not at all doubt but an infinite number of things, that there is no imagination of at present, might serve to the making of *Phosphorus*, when inquisitive men shall have a mind to try it.

It has been observ'd in many men, that when they have been in a great rage, or are become extreme Cholerick, the very hair of their head has shone brighter than usual; and we need not be scrupulous in believing what is said of *Alexander the Great*, that when he was hotly engaged in the battle, fire was seen to sparkle out of his eyes, because his humors were then in an extraordinary commotion.

What I have now said may pass for a general explication on this matter; but if we should descend into particulars nicely, it would be very hard to clear so well as could be wished a great many doubts that have been raised: For example, *wherein* consists the difference of fermentations, which of many light matters makes this to shine, and that not to shine, although they do seem to have undergone the same fermentations and elaborations in a like space of time. *Why* some things that have fermented but little do give a light, and others of the same nature, though they have fermented as long and longer, yet give no light. *Why* one side of a matter shall be luminous, and the other shall not be; we ought to have a very perfect knowledge of the structure and the order of the insensible parts of the matter, to give good substantial reasons for the resolution of these doubts.

Sometimes there have been found in the Shambles pieces of Veal, Mutton, Beef, which do shine in the dark, though they have been but new-

ly killed, and yet other pieces of the same kind killed at the same time, shall not shine at all. Nay, this very year was seen at *Orleans*, in a very temperate season, a great quantity of meat of this sort, some of it would shine all over, and others of it would shine only in some certain places, in form of Stars. It was likewise observed that with some Butchers almost all their meat was found to be luminous, and with other Butchers there was not a bit to be seen of that kind. Men concluded presently that such flesh as this was altogether unwholsome to eat of, they therefore flung away a great deal of it into the river, and several Butchers there were like to be ruin'd by this accident; but at last perceiving that there was such quantities of it, some people ventur'd to eat of it, and at length it was found to be as good meat as any other.

I conceive that this *Phenomenon* may be imputed to two causes.

First, To the Pasturage of the Beasts; for it is certain that in some Countries the Herbs are more spirituous than in others, and those do give such an active impression to the humors of those Beasts who feed on them, that they may have a disposition to the making this *phosphorus*.

Secondly, To these Beasts having been heated more than others in their driving upon the road, or else to their having been killed before they had sufficiently rested after their journey; for the spirits being put into a great motion thereby, do not every where lose it after the Beast is killed, and so long as the spirits do continue their rapid motion, so long the *Phosphorus* is to be seen, but when the flesh begins to stink, there appears no more light in it, because these vigorous spirits are then

then spent, or else they come to be confus'd in the meat by the means of another fermentation.

Objection.

But you will not fail to make me this Objection. If the *Phosphorus* does consist in a violent motion of the insensible parts, then stinking meat should be more luminous than that which was newly killed, because the smell proceeds from the separation of the principles of a mixt body by fermentation, which as they rise from it do strike the Nerve of Smelling, wherefore there must needs be a greater motion of parts in stinking meat than in that which is fresh.

Answer.

I answer, That that which makes the *Phosphorus* in meat newly killed is a matter much more active and more subtile than that which gives the ill smell to stinking meat; it is a remainder of the spirits which do run with a prodigious swiftness through the body of a living creature in all its parts, and unless the matter be in this degree of motion, it will never become lucid, no more than if the insensible parts of inflammable matters be not put into a very rapid motion, they will not take fire.

Perhaps also it may be that the meat in the corrupting might receive a sufficient agitation of parts to produce light, as it happens sometimes in the standing puddles of Urine.

In considering the light which appears upon the surface of standing Urines, I have been led to think that there are oftentimes serosities that settle in the bodies of sick persons which might be in a condition to make kinds of *Phosphorus*, if they had but air enough to illuminate them; at least they do produce the effects of fire, as in Gout, in Rheumatisms, in the *Erysipelas*, and in abundance of other Inflammations.

Monieur

Monſieur Homberg hath diſcovered ſome time ago a new kind of *Phosphorus*, of which take the following deſcription.

New Phosphorus of Monſieur Homberg.

Mix together exactly one part of *Sal Armoniack* powdered, and two parts of *Quick-lime* quenched by the Air: put the mixture into a Crucible, whoſe third part at leaſt remains void; place this Crucible in a Furnace, and heap fire about it to make it red hot: As the matter diſſolveth, it will boil up, and therefore it muſt be ſtirred about with an Iron Spatule leſt it run over. As ſoon as it is diſſolved, pour it into a clean, dry, Copper Baſon, where it will fix and appear like glaſs of a gray colour.

If you ſtrike this matter with a Hammer or Peſtle, you ſhall preſently ſee it on fire: But becauſe this is very brittle, you cannot make theſe Experiments often, for it ſoon turns into Powder, which produces no effect. To prevent this accident, while the matter is in fuſion in the Crucible, dip into it ſmall bars of hot Iron or Copper, that they may be covered with it; and then you may ſtrike upon theſe bars, and make many Experiments upon them before the matter be ſpent: But if you would keep them for any time, they muſt be laid up in a dry and warm place, for this matter ſoon moiſtens, and then it gives no light.

The *Lime* in this Operation fixeth the acid part of the *Sal Armoniack*, and ſetteth the volatile Salt of *Urine* and *Soot* at liberty, which, being diſengaged, and driven by the fire, evaporate into Air: But it is probable, That the light which riſeth from the calcined matter when it is ſtruck upon, cometh from ſome volatile particles which

Remarks upon this Operation.

which are concentrated in the fixt *Sal Armoniack*, and united with the igneous particles of the *Lime*, which move with much rapidity when these are agitated. However it be, This Operation is a *Sal Armoniack*, fixed by *Lime*, and rendered fusible.

Of the Bolonian Stone.

THOSE who heretofore have treated of the *Bolonian Stone*, have given but a very slender account of its Nature and effects. They have spoken of it after such a manner as shews very well, that they had not enquired far into the matter, and that they were ignorant of the greatest and most admired qualities of this *Stone*. It is true, an *Italian*, whose name I do not know, did particularly apply himself to this discovery, and he made great progress in it: But it does not appear, that he did communicate the same to any body, so that the secret has been buried with himself many years ago.

We may say, That Monsieur *Homborg*, a *German Gentleman*, of whom I have spoken already, and who is very well known by his excellent discoveries in *Physick*, not only has brought to light a *Stone* which was almost forgot, but that also he hath far out-done all who have appeared as yet. A Journey which he made into *Italy*, purposely upon this enquiry, gave occasion of making many excellent Remarks upon the places where this *Stone* is found, the Nature of it, and the means of preparing it to render it luminous. I will set down here these many Observations

servations which he hath been pleased to communicate to me, and also the Experiments which I have been present at.

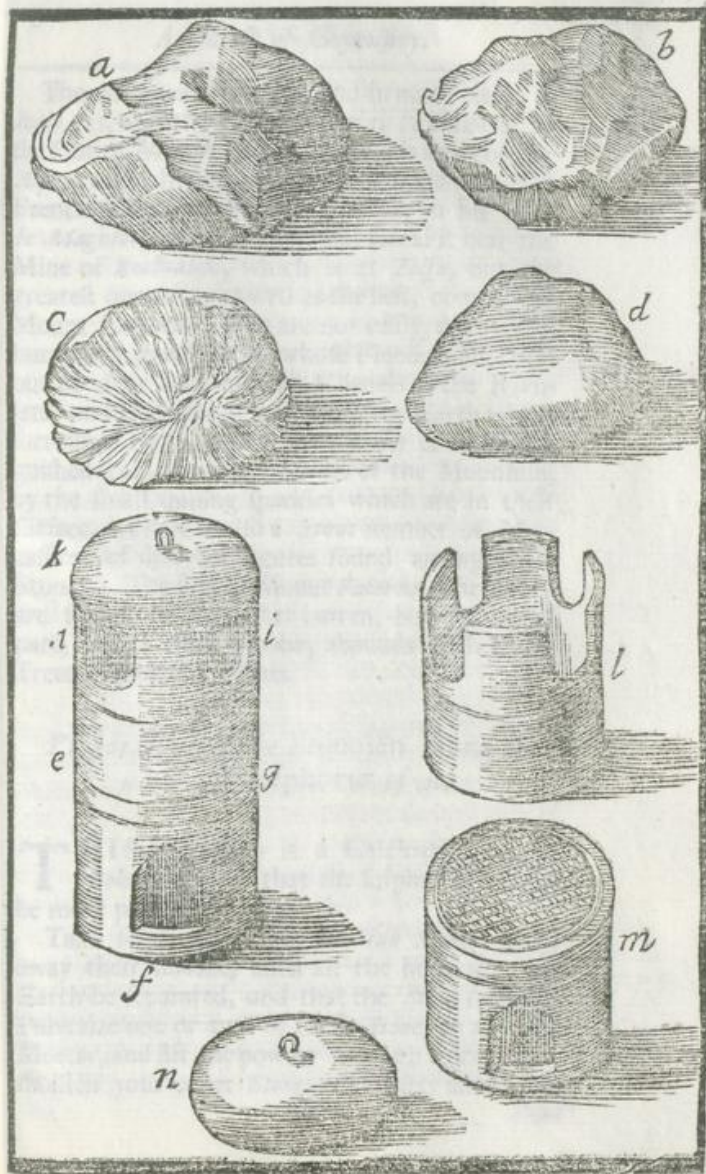
Tho' the *Bolonian Stone* is found about *Bolonia*, a City of *Italy*, which gives it the Name, yet it is not long since it was so little known there, that there was no body in that place, who could give an account of it, and very few who had so much as heard of it. And this was the reason why our Travellers learned nothing of it, and which made the most part believe, that the *Bolonian Stone*, formerly spoken of, was a Composition, the secret of which was lost.

The *Bolonian Stone* is a small gray stone, ^{See the Figures in the} weighty, but soft, sulphureous, sparkling in many places, of the largeness of a Walnut, but ^{Seventh} flat, whose surface is not equal, but bunchy and ^{Table.} protuberant, and the opposite side is hollow. It ^{P. 705.} commonly weighs an ounce and a half, or two ounces; being broken, there appear Crystals much like the *Talk* of Mount *Martyr*. In the Cabinet of *Aldrovandi* at *Bolonia*, there is kept as a curiosity, one of those stones, which weighs two pounds and a half, and another by Monsieur *Cellio* at *Rome*, which weighs five pounds: But these large Stones are only valuable for their rarity; for they are not so good to make the *Phosphorus*, because commonly they are opacous; the small ones are much better, they shine more, and have fewer blemishes: Those of them which have veins of *Vitriol* or *Iron* are least worth. Sometimes *Bolonian Stones* may be met with, which are covered with a thin, white and opacous crust, they are very rare, but they are the best of all.

An

An Explication of the Seventh Table.

- a b* The Bolonian Stone as it is found in the Earth.
- c* A Bolonian Stone broken.
- d* The Bolonian Stone calcined, and prepared for a Phosphorus.
- e* A Small Furnace of Earth.
- f* The Ash-door, and there should be another on the other side.
- g* The grate of Brasse.
- h i* The holes, or open places in the top of the Furnaces.
- k* The Dome.
- l* The Hearth of the Furnace separated from its Dome and Ash-room.
- m* The Ash-room with the grate.
- n* The Dome by it self.



The *Bolonian Stone* is found in many places in *Italy*, as, near the City *Roncaglia*, *Pradalbino*, at the foot of Mount *Paterno*, which is a part of the *Alpes*, and which is distant from *Bolonia* about a French League. Father *Kircher*, in his book *de Magnete*, says, That he has found it near the Mine of *Roch-alom*, which is at *Tosfa*, but the greatest quantity, as well as the best, comes from Mount *Paterno*. They are not easily discovered, but after a great Rain, whose Floods wash them out of their seats into the Channels of the Rivulets, and by cleaning them from the Earth which surrounds them, make them easily to be distinguished from the other Stones of the Mountain, by the small shining sparkles which are in their surface. There is also a great number of *Marcasites* of different figures found among these Stones. The foot of Mount *Paterno*, where they are found, is altogether barren, but the upper part, where there is none, abounds with Fruit-Trees, Vines and Plants.

*Preparation of the Bolonian Stone to
make a Phosphorus of it.*

THIS Operation is a Calcination of the *Bolonian Stone*, that the sulphur of it may be more purified and exalted.

Take seven or eight *Bolonian Stones*, grate away their surface, until all the heterogeneous Earth be separated, and that the Stone do shine. Pulverize one or two of these Stones in a brazen Mortar, and sift the powder through a fine sieve. moisten your other Stones one after another in

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clear Brandy, and powder them all over with the powder, by throwing them into it, and turning them up and down till they be covered with it. Having provided a small Furnace of Earth, as is represented in the Table, whose grate should be of yellow Brass, put into this Furnace five or six kindled coals to heat it, and when these coals are half wasted, fill the Furnace up to the holes or apertures with small cinders, lay your powdered *Stones* above them, and cover them with other cinders, that the Furnace may be full: Fix the Dome above all, and without touching it any more, let the coals and cinders burn out to ashes. When the Furnace is half cold, take away the Dome and the Hearth or Ash-room, as it is represented in the Figure, and you shall find upon the Grate your *Stones* calcined. Lay your Grate softly upon white Paper, and gather up your *Stones*, and keep them in a Box with Cotton, but first take away the crust that is about them, which also is to be kept after it is finely powdered.

Use. These *Stones* thus calcined, are each of them a *Phosphorus*: For if they be exposed but for one moment to the open light, as in a Court or Street, and thereafter set into a dark place, they appear for some time, as kindled coals, without any sensible heat. Their light diminishes by little and little, but it may be recovered, by exposing them a-new to the open Air. This quality will continue two, three, or four years, according as they have been more or less used: and when they lose it, it may be recovered by calcining them anew, after the former manner, but then they shine but faintly.

The

The crust powdered is also a very clear and shining *Phosphorus*, when it is set first to the light, ^{Powder of the crust.} as we have spoken of the *Stones*. You may make different shining figures of this, by drawing, first, these figures upon Paper or Wood, with the white of an Egg; and while the draughts are yet moist, spreading upon them this shining powder, that it fasten or stick to the white of the Egg. When this is done, dry your figures in the shade, put them into a frame, and cover them with a clear glass, that nothing may touch them. When you would make these figures to shine in the dark, you must first expose them to the light, but without taking them out of their frame and cover.

By this powder, *Crysal* also may be made to shine, if you fill a little bottle with it, and stop it carefully; it will produce an effect like to that of the *Stones*, it will also last much longer, but its light will be much more faint.

If you grind the *Bolonian Stone*, after it is calcined with a little water, thereby reducing it into a slime, it will make a very good *Depilatory*: and if you infuse a drachm of the powder into an ounce of water, for some hours; this water will take away the hair, when it is applied to the skin.

Remarks,

The first who calcined the *Bolonian Stone* was ^{How the} a Shoemaker, called *Vimenzo Casciarolo*, who studied Chymistry. This Man walking at the foot of Mount *Paterno* gathered these *Stones*, in which ^{Bolonian Stone was first discovered in the year 1494.} he hoped to find Silver, because they were very light, and of a white shining colour: But in-

stead of Silver, or any other Metal, by calcining them, he discovered, by chance, the strange Phenomena that we now see.

Authors
who have
writ of it.

Poterius, Mountalbanus, Maginus, Licetus, Menzelus, and some others have writ of this, and shewed the way of calcining it: but their accounts are of no use; for we cannot succeed by following their directions.

Seeing the *Bolonian Stone* is soft, the surface of it may be easily grated off: And if there remains any Earth, there will be blemishes in the Stone after calcination, which will hinder its shining clearly.

It is necessary to cover the Stone, with the powder of another Stone,

If you calcine the Stone without overlaying it with the powder of *Phosphorus*, after calcination, there will be only some small sparklings of a weak light, and therefore it is very necessary to observe exactly what I have described. It does not appear that Monsieur *Hombert* was advised to prepare these Stones this way: But what gave occasion to it was, That carrying some of these Stones in a journey, they chanced to rub upon one another, which produced a powder that did stick to some parts of them; and calcining these Stones, without wiping off the powder, after calcination, he perceived, That the parts, on which the powder did lye, were more luminous than others.

The powder must be very fine, to make it stick the better to the Stone, and to give the better light after calcination; for the light coming only from the surface, a fine powder makes a better surface, than that which is gross. This powder ought to be made of the finest, purest, and most transparent Stones, because the shining and

and light of the calcined *Stones* is more or less, according to the fineness of the powder which ^{Effect of} covers them. They use to cover the coarsest *Bol-* ^{the powder} *onian Stones* with fine powder, which makes them ^{upon} appear very well: On the contrary, when they ^{Stones.} cover fine and very transparent *Stones* with gross powder, they are not better than if they had been calcined without the powder, that is, they are not a whit more luminous.

It is necessary to make this powder in a brazen ^{Some cir-} Mortar, otherwise the *Stone*, which is covered ^{cumstances} with it, will not be luminous, how exactly so- ^{to be ob-} ever it be calcined. The Operations have always ^{served.} failed when it was beaten in Mortars of Iron, Marble, Porphyry, or Crystal: But by beating it over again in a brazen Mortar, it has been used in the calcination of the same *Stones*, and has made them a little luminous.

The Powder which is made in an Iron-Mortar ^{Iron of a} is but very little bettered by putting it into one ^{contrary} of Brass, and the *Stone* which is covered with it ^{quality to} does almost not shine at all: So that it seems ^{the Bolo-} there is something in Iron prejudicial to this ^{nian Stone.} quality, and that on the contrary Brass is agreeable to the nature of the *Stone*. As to Marble, Porphyry and Crystal, without doubt, they want the agreeable quality of the Brass, but yet they do not make such a prejudicial impression as Iron. This bad quality of the Iron, it may be, proceeds from the Vitriolick acid of this Metal, which unites to the exalted Sulphur of the *Stone*, thereby fixing it, so that it hinders the light from kindling it to make it shine, as I shall shew afterwards.

*The Stone
must be
moistned
and why.*

Common water may be used instead of Brandy, for moistning of the *Stone*, providing that this water be very clear and without all sediment. They use also acid Spirits which have succeeded as well as Brandy. They moisten the *Stone*, that the powder may stick better, and make a kind of Crust about it.

*Description
of the Fur-
nace. See
the Seventh
Figure,
p. 705.*

The Furnace for this calcination should be made of the same matter as other portable Furnaces, round, about a foot high, besides the Dome, and near a foot and a half diameter. Its Ash-room should have two doors to give the fire more Air; the Hearth should have none, but in the upper part there must be three or four hollow cuts, as is shewed in the Figure. A small Dome is set upon the Furnace for reverberating the fire towards the matter. There is no need of holes to this Dome, but a ring is fixed on the top of it for the more convenient setting it on and taking it off again. The Grate ought to be of the finest Brass or Yellow Copper, for if it was of Iron, it might be prejudicial to the Operation, as well as the Mortar of Iron; and if of Earth, the fire would not be so violent: Besides that, Brass does help to make the *Stone* luminous, Red Copper has not so good an effect, perhaps, because it does not contain any *Cadmea*; for probably this *Stone* sendeth up some vapour in the calcination, which opens the pores of the *Boltonian Stone*, that its sulphur may be more susceptible of the impression of light. It is fit that the small Furnace be divided into two parts, as is represented in the Figure, that, when the fire is out, the upper part may be removed, and the calcined *Stones* easily taken up.

*The Grate
must be of
Brass.*

The

The first fire which they put in the Furnace is only to heat it, and therefore common coals are sufficient: But if they be used during the whole Calcination, the crackling of the Coals in the Furnace may shake the *Stones*, and lose the powder which is upon them; *Cinders* are better, but each piece must be no bigger than a Nut, in case they should give too great heat: Neither must they be too small, lest they smother the fire.

*Cinders
must be used
in the Cal-
cination.*

The *Stone* becomes the colour of the fire, which was used in the Operation. So when the fire is white, the *Stone* becomes white also; if the fire be of a purple colour, the *Stone* shall also be of a purple colour: If we make the fire green, the *Stone* shall give a green light. If the fire be yellow, the *Stone* casteth a yellow light; but when you have a mind to make the *Stone* of these colours, you must take care not to use things that are fix'd, but what are altogether volatile, lest they darken the *Stone*.

*The Stone
retains the
colour of
the fire.*

When you would calcine the *Stone*, as I have already described, without adding any other artifice to the fire, it shall always appear like a burning Coal, provided there be no Metallick or Mineral parts in it. If there be any Copper in it, it shall give a green or blue colour, if there be any particles of Iron mixed with it, it shall be dark and good for nothing; if it contains any *Sal Armoniack*, the light shall be white; the *Stones* covered naturally with a white and thin Crust, of which I have already spoken, give a blue or green colour.

If the *Stones* be of a yellow colour when they are taken out of the Furnace, they are good: but

*Best colour
after calci-
nation.*

but if there be gray, white, or black stains upon them, they will not shine at all.

The powder which was put about the *Stone*, and moistned with *Spirit of Wine*, dries in the calcination to a Crust, and frequently small bits of it fall off into the Ashes, which prejudices the Operation; for the *Stone* gives but a small light in those places where the powder falls off.

If, by any accident, the *Stones* are not luminous after the Calcination, you must begin the Operation again, observing the same circumstances, and then you shall have them good.

Stones, which are re-calcined, after they have been used two, three or four years, shall give a pretty good white light, but will not be so bright as it was at first. After the first Calcination, the *Stones* are easily separated from the powder or Crust which was about them: you may take it off with a small stick: but when they have been calcined the second time, the Crust is more difficult to be got off; the reason is, because that after the first calcination, there is a great deal more Sulphur upon the surface of the *Stone*, than after the second: And the oily sulphur hinders the Crust from sticking to the *Stone*.

The *Bolonian Stone*, being calcined, smells of Sulphur, almost like the *Phosphorus*, which is made of *Urine*, or of a *Lixivium* made of *Chalk* and *Orpiment*, but much weaker: It smells much stronger at first than after it has been some time kept. We may reasonably conjecture, by its smell, and by its taking off the hair, that it contains a saline and arsenical Sulphur, or a Sulphur, in which a great quantity of the particles of the fire used in the calcination, are contained.

If

If you lay the calcined *Bolonian Stone* for some time upon a polished plate of *Brass*, the *Brass* shall become white like Silver, not only in the place where the *Stone* touched, but also all round about it: The reason of this is, because the saline Sulphur of the *Stone* penetrating into the yellow *Brass*, and changing the external disposition of the parts of this Metal, causes a different reflection of the light from that which the *Brass* gave before.

You must let the *Stone* cool, after it is calcined, before you expose it to the light; for when it is hot, it is not so luminous as when it is cold. If you expose the *Stone* to the light in a Chamber or Hall, it will not become luminous; but you must hold it in your hand out at the Window, in the open Air, that the rays of light may fall perpendicularly upon it; yet you must not hold it immediately in the Sun; for then its light will not be so good, and the Sun will waste it too much, in carrying off, by its heat, a too great quantity of the particles of Sulphur, which are necessary to it. When the Sun is setting it will take a much better light than in the mid-day. But when it is set, it will take almost no light at all, tho' the firmament be full light. In the darkest day, and greatest tempests, provided that the Sun be above our Horizon, it will become more luminous than in the most serene day: If you expose it in the night, it will take no light at all: It will take a little from the light of the Moon, but less from that of a Torch. The Air is of no use to this *Stone*, for if you pump all the Air out of a glass or Crystal bottle, in which the *Stone* is contained, and stopping it with a stopple

of

of glass or *Spanish* wax, you expose it to the light, the *Stone* will receive as much of it, tho' it be in a *Vacuum*, as it would in the open Air without the bottle. But seeing it is covered with glass or Crystal, its fire will not appear so bright, because the rays, which come from it, being broken, in passing through these transparent walls, strike not the *Retina* of our eyes with so much force as when the *Stone* is naked. This *Phosphorus* differs from that which is drawn from *Urine*, in this, that it must have light, and the other only Air. That you may the better perceive the light of the *Bolonian Stone*, you must shut your self up in darkness for some time, that you may bring your eyes from a disposition fit to receive a great light, to a disposition fit to receive a small light of the *Bolonian Stone*. This is to be done chiefly in very clear and serene days; for in gloomy and rainy weather, there needs not this disposition; our eyes being already fitted for a small light, are disposed to receive that of the *Stone*.

Some circumstances
to be observed for seeing
the light
of the *Stone*.

The *Bolonian Stone*
is only luminous in
its surface.

The *Bolonian Stone* is luminous only in its surface; for if you break it, it gives no light from its inside. Indeed if you calcine this inside, it will appear luminous as the rest of the superficies of the *Stone*. The powder which was about the *Stone* during the calcination, being exposed to the light, and afterwards put in the dark, will appear all on a fire: But if you remove its external surface, the powder, which is under, is dark. If you spread it, and put it again in the light, it will appear luminous over all.

It may be
called a
sponge of
light.

Having spoke of several pretty effects of the *Bolonian Stone*, which may be called a sponge of light;

light; I believe it will not be improper to reflect upon these effects, and give some reasons for explaining, as much as can be, how this *Stone* imbibes the light. For this, I shall consider two things, What Light is, and what disposition the *Stone* ought to have to receive it.

Not to trouble my self with all that the Philosophers have wrote upon this subject of Light, I say, That it is a fire, which coming impetuously from the Sun, in great rays, which divide themselves into an infinite number of small rays, which cover the Universe, and turn weaker and weaker in proportion as they go from their Centre. If any doubt of this, he may be convinced by means of a Concave reflecting-glass; he shall see, that Light reflected, and gathered together in a point, makes fire.

Light is a fire.

The *Bolonian Stone* (as I have already remarked) is full of Sulphur, but this Sulphur, before its calcination, is so well united with the other principles, which compose the *Stone*, that it appears not at all: And it is no more luminous than any other stone. The fire in which it is put opens its pores, and exalts its Sulphur, of which a great part is lost in the Air, but there still remains a great deal, which is stopp'd by the powder that is about the *Stone*. If it be not calcined so much as I have remarked, its pores will not be open enough, nor its Sulphur in a sufficient motion: It may happen, that a part of the grosser Sulphur which is first raised, may hurt the effect of the *Stone* in stopping upon its surface. On the contrary, if it be too much calcined, it is to be feared that too much of the Sulphur has evaporated by the heat of the fire,
and

and that the *Stone* will produce little or no effect. This happens also when it has not been covered with the powder of another stone; for the Sulphur then finding an open passage, without any resistance, flies all away: And the *Stone* takes but very little light: But the powder not only stops a part of the volatilized Sulphur, but also gives some to the *Stone*. The sulphureous smell which the *Stone* has after calcination, shews, That there remains a great deal of Sulphur in it. It is therefore certain, by all Experiments, That the calcined *Stone*, which gives light, contains a very exalted Sulphur, whose insensible particles are in motion upon its surface.

The Bolo-
nian Stone
calcined
contains an
exalted
Sulphur.

The fire of
light kin-
dles the
Sulphur of
the Stone.

These things being granted, which to me appear indisputable, I say, That the calcined *Bolonian Stone* becomes luminous, when exposed to light, because the light, which is a fire, lightens the Sulphur which is upon the surface, and makes it appear burning, the same way as the fire lights Charcoal. Let us now see if we can give a reason for all the Experiments, and resolve all the difficulties.

This Stone
contains
some par-
ticles of
fire.

The *Bolonian Stone* in the Calcination has been reduced into a kind of Chalk; and it is probable, that in room of the Sulphur which evaporates, small particles of fire did enter, which were entangled in the branches of the Sulphur which remain, as I have proved, it happens to several other calcined bodies; these small igneous particles may conduce greatly to render the Sulphur of the *Stones* susceptible of the fire of light: For altho' they be enclosed in the pores of the matter, as in little cells, yet they endeavour by their motion to get out, they vola-
tilize

tilize and divide the particles of the Sulphur so subtilly, that a very weak fire, as that of light weakned by clouds, is capable to light it.

When the *Stone* is lighted it does not appear luminous in the light, because our eyes being disposed to receive a great light are incapable of perceiving this little fire, almost for the same reason that we do not discern the light of the Moon whilst the Sun is above our Horizon: But when we have shut our selves up in darkness, the light of the day beating no more upon our eyes, hinders not the fire of the *Stone* from appearing in all its brightness. This fire lasts about half an hour weakning by little and little, and then it goes out, because the lighted particles of Sulphur being surrounded with a great quantity of Terrestrial matter, have not the force to continue their motion, they must be lighted frequently at the light, if you would have them continue shining. It is not altogether in this respect as in Charcoal, which contains a great deal of more Sulphur, and less terrestrial parts than the *Bolonian Stone*, and which continues burning without having need of being lighted again.

Why it does not shine in the light.

The reason why its light goes out, and shines again.

Difficulty.

Answer.

But here there is a difficulty, which is, to know wherefore the *Stone* appears less luminous, when exposed hot from the Furnace than when cold: For it would seem, that the Sulphur being in greater motion during the heat than when cold, it ought also to give a greater light.

We may answer to this difficulty, two different ways. The First is, That the Sulphur may be more inflamed during the heat of the *Stone* than when it is cold. But this Sulphur burning with too great a force, its fire is so rarefied, it appears

appears not so much as when it is more fixed. The same as Charcoal lighted has a higher colour than the flame of wood which is a fire a great deal more exalted. The second answer is, That as there is more Sulphur at the surface of the *Stone*, whilst it is yet hot, than when it is cold: And that this Sulphur may draw with it some gross particles, the light, which is a very delicate fire, has not the strength to inflame it so easily, instead, that when the *Stone* is cold, the exalted Sulphur, which is in motion upon the surface of the *Stone*, being much more subtle, because the grosser parts are fallen back into the *Stone*, has a greater proportion with the strength of the light, and it is inflamed more easily.

Objection. One may object, That we see a great number of Sulphurs and sulphureous matter, which appear to us very exalted and rarefied, as the *Spirit of Wine*, the spirituous *Oil of Turpentine*, *Campfire*, which burn not at all, being exposed to the light.

Answer. I Answer, That these Sulphurs have not so great subtilty nor fineness in their parts as that of the *Bolonian Stone*; they must have a grosser fire than light, to put them in motion and set them a burning.

Why the Bolonian Stone does not burn the skin. The fire which appears upon the *Bolonian Stone* is neither capable of burning nor heating the skin when we touch it; because being so fine, it has not the strength to make the impression upon the Nerves. The fire which heats must be composed not only of Sulphur but of saline and gross parts, which passing through the pores may shake them sufficiently to cause a sensation.

When

which cover them in an Iron Mortar, the impression that this powder receives from this Metal, how little soever it be, is capable to hinder the *Stone* from receiving light. We may say, That it is like a wet Match, which cannot receive the fire that comes from a *Fusée*, the Iron by its Vitriolick Salt fixes and entangles the sulphureous parts of the *Stone*, and hinders them from receiving light.

Why its light is of the colour of the fire which was used.

The *Stone* takes a light of the colour of the fire, which was used in the calcination, because its Sulphur is tintured with this colour, and when it is set on fire by the light, it ought to give a light of the same colour; the Sulphur takes also the colour of any metallick impression, which it receives from the *Stone*, and it casts a blue, or green, or white light, according to the nature and colour of these metallick matters for the same reason.

How it recovers its light upon a new calcination.

After that the inflammable sulphureous particles of the *Stone* have been entirely consumed by the fire of the light which happens in the space of some few years, as I have already said, we calcine the *Stone* again to rarefie and exalt the Sulphur which remains, and to render it capable of being set on fire by the light; but as it never is so subtile, nor so susceptible of motion, as that of the first calcination, its fire is neither so bright nor lively.

The powder which is taken from about the *Stone*, after the calcination, being spread upon Paper, and exposed to the light, gives a greater light in proportion than the *Stone* it self, because the external surfaces of the parts of the powder have been set on fire, and they fill up a greater space than that of the *Stone*. It

It may be objected, that if this be true, That *Objection;*
the light of the calcined *Bolonian Stone* comes
from its Sulphur, set on fire by the fire of the
light, then Air would be as necessary to this fire
as it is to all other fires that we know, which if
by any accident it be wanting, the fire goes out.
Nevertheless we see that the *Stone* and powder
calcined take and preserve their light in a *vacuum*,
as has been said.

I answer to this objection, That the sulphu- *Answer;*
reous parts of the *Stone* being supposed of a fine-
ness proportioned to the fire of light, there is no
need of Air to light them, nor to preserve them
burning: For if the light pass, and preserve it
self in a *vacuum*, it can also set on fire a very
subtile Sulphur, and preserve it burning. But
if this reason do not please, and that you think
Air absolutely necessary for burning the *Bolonian
Stone*, you may find as much as is needful in that
which we call a *vacuum*, since it is impossible en-
tirely to pump the Air out of a vessel of glass or
Crystal, but there will always remain a little, do
what you can: and this little quantity of Air is
sufficient for lighting so fine a Sulphur.

But this fire ought not to be considered as a
common fire, which is nourished and preserved
by gross substances, which indeed cannot subsist
without Air, because Air excites and preserves
the motion of the parts of the gross combustible
matter; but our fire is of a very different
fineness; it is made and preserved by the motion
of a very fine and subtile substance, upon which
Air can make no impression: It is a concentra-
ted light that the most impetuous winds can nei-
ther light nor extinguish: And we may say,

A a a a

That

Remark-
able diffe-
rences be-
tween the
Phospho-
rus of the
Bolonian
Stone and
that of
Urine.

That this fire has no more need of Air for burning, than light has of it for shining.

You may observe considerable differences between the *Phosphorus* made of *Urine*, and that of the *Bolonian Stone*; for the first becomes luminous either in the day or night, providing it be exposed to the Air: But if you take it from the Air, it can give no light at all. The last receives its light only in the day time, either in the Air, or out of the Air, but none at all in the night. This makes it evident, that these two kinds of *Phosphorus*'s are differently lighted. All the parts of the *Phosphorus* made of *Urine* give light; the surface only of the *Bolonian Stone* shines. The light of the *Phosphorus* drawn from *Urine* is always of the same colour, that of the *Bolonian Stone* appears frequently of different colours, and always more lively than the other. The *Phosphorus* made of *Urine* may be spread abroad at pleasure; for of it Letters and other figures may be made, in rubbing it upon Paper, or any thing else, as if you was writing, which cannot be done with the *Bolonian Stone*. The *Phosphorus* drawn from *Urine* burns the fingers when it is held for some time, and it will set on fire several combustible substances; the heat of the *Bolonian Stone* cannot be perceived when touch'd, neither does it give fire to any thing. The *Phosphorus* drawn from *Urine*, being extinguished, can be only preserved in water; for if it be not, it will smoke continually, and destroy it self in a little time. The *Bolonian Stone* may be preserved in a dry box, and there never comes any smoke from it. The *Phosphorus* drawn from *Urin* dissolves in an oily liquor; the *Bolonian stone* will

will not dissolve. The *Phosphorus* made of *Urine* being hot, gives a greater light than when cold; the *Bolonian Stone*, on the contrary, receives the light better when it's cold than when it is hot: Now I will give a reason of all these differences.

First, The *Phosphorus* drawn from *Urine* cannot be set on fire by light alone, because its Sulphur is too gross to be burnt by so fine a fire as it is: There must be a pair of Bellows such as the Air is, to put the saline and sulphureous parts of the *Phosphorus* in motion, that by rubbing violently upon one another, they may take fire, the same as in striking Iron upon a hard stone, fire is produced; for this, there must be a great disposition to motion in the parts of the matter. As to the *Bolonian Stone*, its Sulphur is so exalted, and so well purified from the grosser parts, that it has no need of any other motion than that of the light to set it on fire; its Sulphur will not take fire at night, because then there is nothing which can light it: All the Air in the world is not capable to move its parts so swiftly as is necessary to inflame it; they are too subtle to receive any impression from it.

Secondly, All the parts of the *Phosphorus* drawn from *Urine* give light; the surface only of the *Bolonian Stone* shines, because all the parts of the *Phosphorus* made of *Urine* are susceptible of such a motion as is requisite to put them on fire; whereas in the *Bolonian Stone*, there are none but the superficial sulphureous particles that can be set on fire, because there are none but those which have been sufficiently exalted and put in motion in the calcination.

Thirdly, The light of the *Phosphorus* made of *Urine*, is always of the same colour, because it always comes from a fire, made of a substance of the same nature; but the *Bolonian Stones* give lights of different colours, because they partake of the different *Marcaassites*, which in the calcination acquire colours according to their kinds, which they give to, and which appear in the fire. The light of the *Bolonian Stone* is more lively than that of the *Phosphorus* made of *Urine*, because its Sulphur is purer.

Fourthly, The *Phosphorus* drawn from *Urine* may be extended, because it is almost all Sulphur, there are little or no Salt and Earth in it: And every one knows, that Sulphur is a substance which may be extended more than any other. The *Bolonian Stone* contains a Sulphur, but it is surrounded with so much Earth, that it cannot be extended or fixed to Paper.

Fifthly, The *Phosphorus* drawn from *Urine* burns the fingers; and the *Bolonian Stone* gives no heat at all, because the fire of the *Phosphorus* drawn from *Urine* is made and preserved by a substance gross enough to make impression upon the flesh, in rubbing and shaking roughly the fibres of the Nerves. But the fire of the *Bolonian Stone* being produced by light, and preserved by a very fine and delicate Sulphur, has not strength enough to shake the Nerves, nor to give any perception of heat when it is touched. For the same reason, the *Phosphorus* made of *Urine* sets combustible substances on fire, whilst the *Bolonian Stone* cannot light any thing; for the rapid motion, which is excited in the insensible parts of the *Phosphorus* made of *Urine*, in scraping it

it with the point of a knife, upon the substance which we would set on fire, or in covering it hot with the same substance, is capable to excite in it a fire much more violent than that of light. But you must observe, That if you would burn with the *Phosphorus* ordinary white Paper, or any white or polish'd substance, you must make it a little rough first, that the small hairs which you raise upon the surface, may easily take fire; for if you observe not this circumstance, the *Phosphorus*, tho' it burns, yet it will not give enough of its fire for inflaming the Paper. The reason is, because the insensible parts, which compose that which we call white, being above any disposed to reflect the light, the fire of the *Phosphorus* cannot fix upon it, unless you give it a sort of match by rubbing of the Paper. There is not the same difficulty in Paper which has been wrote upon, or in other black combustible substances, altho' they be polish'd: The fire of the *Phosphorus* fixes easily upon them, and burns them, because black reflects not the light. It is almost the same as when one lays fair white Paper, and Paper that has been writ, before the Sun, near to a burning-glass, the Paper which has been writ upon takes much sooner fire than that which is white. As to the *Bolonian Stone*, it cannot set any thing on fire, because its fire is too fine, it passes and repasses, as light does in combustible matters, without burning them, because it has not sufficient strength to shake their insensible parts. If you scrape a little of the *Bolonian Stone* upon Paper or cloath, of whatsoever colour they be, and howsoever prepared, yet it will never burn them, tho' you have heated it before you scrape it.

A a a 4

Sixthly,

Sixthly, The *Phosphorus* made of *Urine* is kept in water, and the *Bolonian Stone* dry; the reason is, because the *Phosphorus* made of *Urine* being almost all Sulphur, water condenses its parts as it does other Sulphurs, by which it hinders the Air from dissipating them; but the sulphureous particles of the *Bolonian Stone* being wrapt up in a great deal of Earth, which hinders them from exhaling, they have no need of water to retain them; it is sufficient you put the *Stone* in a Box, with a little Cotton about it. It is probable too, that these sulphureous particles being continually in motion, upon the surface of the *Stone*, some of them fly away, but the greatest part enter its pores, and give light upon occasion, till all the Sulphur be evaporated: The greatest part are spent when the *Stone* is lighted, therefore it lasts much longer when it is exposed to the Air but seldom, than when it is exposed frequently.

The *Bolonian Stone* receives light when it is wet as well as when it is dry: The aqueous humidity is not capable to hinder its Sulphur from burning, because it cannot mix with it, it slides upon it as it does upon other substances. But if it be left in water, as the *Phosphorus* made of *Urine* is, it is to be feared, that its earthy parts would soften as Chalk, and embrace too closely the sulphureous parts, and being confounded together, they would give us no more light.

Seventhly, The *Phosphorus* made of *Urine* dissolves in Oil, but the *Bolonian Stone* does not. The reason of this is, Because the *Phosphorus* made of *Urine* being properly a Sulphur, or Oil coagulated with a little Salt, oily liquors are proper solvents

dissolvents to its nature, because they fix easily to its oily parts, and separate them from one another. But the *Bolonian Stone* contains a great deal of Earth and Sulphur, which dissolve not in Oil; therefore it remains luminous in it as it was before. However, if you let it lye too long in any oily liquor, a part of its Sulphur will fall off, and the *Stone* will become less luminous, but the liquor will give no light, either because it contains too little of the Sulphur of the *Stone*, or because the luminous Sulphur is confounded with the gross and dark sulphureous liquor.

Eighthly, The *Phosphorus* drawn from *Urine* being hot, gives a better light than when it is cold; on the contrary, the *Bolonian Stone* shines better when it is cold than when it is hot: The reason is, because the parts of the *Phosphorus* made of *Urine* acquire by heat a more impetuous motion, and by consequence more capable of burning than when they are cold: But the Sulphur of the *Bolonian Stone* being very subtile and pure, rarefies so, and is dissipated so quickly being hot, that it does not appear to us so much as when it is cold, as I have said elsewhere.

The Hermetick PHOSPHORUS of
BALDUINUS.

IT is a mixture of Chalk, and the acid Spirits of *Aqua fortis*, which makes it lucid.

Make red hot about two pounds of Chalk, then let it cool, and powder it.

Take a quantity of *Aqua fortis*, for example a pound, pour it into a great glass body, and throw
into

into it a spoonful of your calcined Chalk powdered, it will make a strong ebullition; when that shall be dissolved, throw into it as much more, and continue to do so until it makes no ebullition; let the liquor settle, and decant it into an earthen pan placed in sand, and evaporate all the liquor with a little fire, and then you will find a kind of salt at bottom.

Put this Salt into a Coppel, or into an earthen pan unglazed, set it in sand in a gentle heat, the matter being heated will swell, continue this gentle heat about an hour, or until it be a little sunk, cover it then with a cover or lid that has three or four holes in it, increase the fire by little and little, until it be strong enough to melt the matter, and when it is melted you must expect to see a yellow vapour come forth through the holes of the lid: so soon as that appears you must take your vessel off the fire, and having covered it with an earthen lid without holes instead of that with holes suffer it to cool.

You will find on the sides of your vessel a border of yellow matter, which is sometimes to the thickness of a finger, this is the *Phosphorus*, take it and keep it in a Box well stopt in some dark place.

When you would have it appear lucid in the dark, you must expose it about a quarter of an hour to the light, without which it will not shine in the dark.

Remarks.

Chalk is a bituminous earth called in Latin *Creta*, from the Isle of *Crete*, where there is abundance of it. It likewise abounds in many other Countries.

Countries. Some Authors do recount three sorts of it, the white, the greenish, and the black, but that which we use in this operation is the common, the white: It is calcined in order to make its *Sulphur* more active than it was before; the more volatile part of it flies away, but there is still enough remaining to make the *Phosphorus*.

Altho' *Chalk* be bituminous, nevertheless it is an alkali, because the *Sulphurs* which it contains in small quantity are not capable to shut the pores of it; and besides, the calcination opens them more, and disposes this earth to receive more easily the impression of acids, which plainly shews it self by the strong ebullition that happens when it is thrown into the *Aqua fortis*. The body must be large, and the *Chalk* must be thrown into it by little and little, to hinder the matter from boiling over. The *Chalk* does all of it dissolve perfectly in the *Aqua fortis*; and more is still to be added, until there be no further ebullition; for that is the sign that the acid spirits have rarefied the matter as much as they were able, and that being as it were sheathed or locked up in the matter, they could not possibly dissolve any more of it; if therefore you should still add more in superfluity, the overplus would precipitate to the bottom. When the *Aqua fortis* you use is good, it dissolves very near its weight in *Chalk*; the solution of it is yellow.

That which is evaporated is the more phlegmatick part of *Aqua fortis*, and the acid Spirits being incorporated with the *Chalk* do make a kind of austere Salt; this Salt might very easily be dissolved into a liquor in the Air. It is fit that it should be very dry, when it is put into the Coppel, that
the

the Operation may be done the sooner; the vessel is covered, that the matter may be the more easily melted, but the cover must needs have holes in it, to give vent to the vapours which rise from it, and that we may see when the vapours do come yellow, that we may then immediately take the vessel off the fire, for these yellow vapours are they that make the *Phosphorus lucid*.

After Calcination you find at bottom of the Pan, or Coppel, a terrestrious matter which must be flung away as useless.

In order to preserve this *Phosphorus* the better you may leave it as it is in the vessel wherein it was calcined, but you must stop it close in a Box with a glass lid. That its Sulphur may not dissipate too quickly, it receives the light through a glass as the *Bolonian Stone* does, and for the same reason, but its fire is not so bright. It lasts luminous only fifteen days or thereabouts, after which it goes out for ever.

It is to be kept in a shady place, that its parts being thereby the more condensed, they may spend the more slowly; and when you would have it to shine in the dark, you must expose it to the Air about a quarter of an hour, because the Air does put its parts into a motion. This *Phosphorus* is in its effects very like to the *Bolonian Stone*, but that takes the Air much sooner than this *Stone*, because it contains abundantly more Salt; its light does not endure so long as that of the *Phosphorus* which I described before.

These two last Operations are by accident in the third part of Animals, tho' they have no relation to them, that they may follow the Phosphorus.

CHAP.

CHAP. III.

Of Harts-horn.

THE Horns which grow out of the head of a Hart, are made of a glutinous humour of the Brain, which being thrust by the Spirits of this Animal, shoots out first in two little and tender Horns without Branches, which receiving nourishment from their vessels in great abundance, grow considerably big in a little time, and they spread themselves into several Branches which becomes as hard as Bones: These are the Arms of this Creature. It casts its Horns every year about Spring time, because the part which sticks in the Head turns so hard in the Winter, as that the glutinous humour which is thrust from the Brain, cannot enter it; therefore it forms new Horns underneath, which sprouting out make the old ones to fall off. This is done in the Spring time rather than in any other season, because then these little Horns, which are a kind of Plants, begin to grow.

Rasped *Harts-horn* is used in powder, and in *Rasped*
Ptisans, to stop the Flux, spitting of Blood, to *Harts-*
resist malignant Fevers, and for killing of Worms. *horn. Use.*

A Jelly is also made of it by boiling it well in water till the glutinous part of the Horn softens and dissolve in the water: They sweeten it with Sugar: It has a greater vertue than the *Jelly*
Ptisans. It strengthens the Heart. Sometimes *of Harts-*
they *horn.*

they put into it a little White Wine, Lemon
and Cinnamon.

Of the water of Harts-head.

THIS Operation is only the more phleg-
matick part of *Harts-horn*.

Take what quantity you will of young and
tender Horns, which grow out of the *Harts*
head in the Spring: Cut them thin, and put them
in a glass body, fix its Head and Receiver to it,
lute the junctures, and distil in a *Balneum vaporis*,
or *Balneum Mariae* all their humidity. This is
the water of *Harts-head*, which is very much
esteemed for helping of Births, and for resisting
of malignant humours in malignant Fevers.

Vertue.

Dose.

*Water
drawn from
parts of
Animals
and their
Excrements*

The Dose is from one ounce to four ounces.
After this manner may be drawn the Water of
After-birth, Blood, Snails, Frogs and Frogs-
spawn, Cows-dung, and of all other flesh of Ani-
mals and their Excrements.

Remarks.

Altho' this distillation be called the Water of
Harts-head, yet we use ordinarily only the young
Horns which are full of Juice; therefore they
are easily cut, and their humidity is drawn off
by distillation. They must be distilled in a *Bal-*
neum Mariae, or *Balneum vaporis*; for by any
other kind of heat they will burn, and the water
when it is drawn will have a burnt smell.

Tho' this Water is very much esteemed, yet
it has no great vertue, being it is only a mixt
phlegm.

phlegm. The volatile Salt and Oil, in which all the vertue of Harts-horn consists, remain with the rest in the glass body.

To make a Water of Harts-head, which may have some vertue, you must mix with the cut *A compound matter of Harts-horn.* Harts-horn, a little Cinnamon, Mace, Orange-pill, and other Hysterick Aromaticks, which may be proper, and steep them all in good White-Wine, let them all digest for some time, and then distil them.

To make the volatile Salt, Spirit, and Oil of *The Volatile Salt, Spirit and Oil of* Harts-horn, you must do as in the distillation of *Harts-horn.* Vipers. In this, you may use the pieces of Harts-horn which remained in the glass body horn after the water was distilled.

If you distil thirty two ounces of *Quantity.* Harts-horn cut in thin slices, you may draw off thirteen ounces of liquor, and of the volatile Salt: There will remain in the Retort nineteen ounces of a substance as black as Charcoal.

You may draw from the liquor an ounce and a half of volatile Salt, six ounces of Spirit, and two ounces of black Oil.

The black matter being powdered is useful in painting: if you calcine it whole amongst Charcoals, the fuliginosity which made it black will be exalted, and leave the *Prepared Harts-horn and its vertue.* Harts-horn white; you shall have sixteen ounces of it. This is what they call prepared Harts-horn: it is esteemed a Cordial; but it has no other vertue, than to destroy acids, as all other alkaalin bodies do.

Some calcine the Harts-horn with Bricks, lay *Harts-horn philosophically prepared.* it, lay upon lay, which they call Harts-horn philosophically prepared; and they esteem it more Cordial than it was before: but they are grossly

grossly deceived; for by the Calcination the volatile Salts and Oil, which might have made it Cordial are exhaled, and there remains only a terrestrial matter, which may be called a *Caput Mortuum*. However, it is an alkali, which may be used as Crabs-eyes, Coral, and several other like things for absorbing of acidities: The Brick gives it not any vertue.

A good preparation of Harts-horn.

The Preparation which appears to me most reasonable of all those that are called *Harts-horn* philosophically prepared, is that which is done by laying bits of *Harts-horn* in the heads of the Alembicks where Aromatick Plants are distilled, such as *Balm*, *Betony* and *Marjoram*; for the vapour which rises from these Plants, penetrating the *Harts-horn*, may give it a little of their vertue; but then the *Harts-horn* must not be calcined: You may rasp it afterwards, and use it at pleasure.

CHAP. IV.

Of the Skull and Brain of Man.

Altho' the *Brain* of Man is very full of a viscous phlegm, yet it contains most subtil Spirits which are continually sublimated from the Body, therefore we may be convinced, that from it several good and useful Remedies may be drawn.

The

The Head which ought to be used in Medicin *The choice*
 should be taken from the Body of a strong, health- *of a Skull.*
 ful young Man, newly dead of a violent Death,
 and which has not been interred, that all its
 active principles may be preserved, of which the
 most volatile part would fly away in the ground.

The humane Skull dried, raised, and powder- *Virtue.*
 ed, is thought very good for the Epilepsie, and
 other distempers of the Brain. The Dose is from *Dose.*
 ten grains to two scruples. It operates by its
 volatile Salt.

The method which several Authors prescribe *The bad*
 to calcine the humane Skull ought not to be fol- *preparation*
 lowed, because by the calcination, its volatile *of a humane*
 Salt and Oil, in which all its virtue consists, are *Skull.*
 dissipated: So that all that remains, which they
 grind carefully, upon a Porphyry, to make that
 which they call *Cranium humanum præparatum*,
 is nothing but an alkaline terrestrial substance, de-
 prived of all its active parts, and which has no
 other quality than to sweeten the acidities of the
 Body, and to stop Fluxes and Hemorrhagies.

We find upon Skulls, that have been lying in
 the open Air for some years, a kind of green Moss
 called *Ufnea*, which is used in Medicin. It is *Ufnea.*
 brought from Ireland, where it is common, be-
 cause in that country those that are hanged re-
 main upon the Gibbet till they fall off: during
 which time the flesh and membranes of the head
 being consumed, this Moss grows upon the Skull.

It is very astringent, and stops Blood, being *Virtue.*
 applied externally. Some pretend, That the
 putting a small bit of it up the Nostrils, is an
 infallible remedy against the Hemorrhagies of the
 Nose. *Crollius* uses it in his Sympathetick Oint-

B b b

ment;

ment ; It may be used for the Epilepsie, for it contains a great deal of the volatile Salt of the *Skull*.

*The distillation of the Skull and Brains
of Man.*

THIS Operation is a separation of the principles contained in the humane Head.

Take the Head of a Young Man, who died in health and strength of a violent Death: Separate the skin and flesh, and break the *Skull* into small pieces, put it with all that it contains, in two or three Retorts of glass or earth, covered over with a Lute, fill them half full, place your Retorts in one or more reverberatory Furnaces: Fix to every one of them a glass Receiver, lute their junctures exactly: make a little fire of Charcoal for four or five hours under the Retorts, that they may heat insensibly, and that the phlegmatick part of the *Brain* may be distilled drop by drop: afterwards encrease your fire by little and little to the third degree, there will come out white clouds which will fill the Receiver, then a black Oil and volatile Salt, which will stick to the sides of the Receiver. Continue the fire, encreasing it towards the end until nothing more comes out, which you may know when the Receiver turns clear and cold. Then let the fire go out, and the vessels being cold, unlute and separate them: in the Receivers you shall find a great deal of phlegm, volatile Salt, and a black and stinking Oil: shake them well, that you

you may loosen and dissolve the volatile Salt which sticks to their sides: Then pour all this liquor into a Funnel trim'd with brown Paper, which must be put upon a body of glats, the Spirit shall be filtrated, and the black and stinking Oil shall remain, which you may put into a Bottle to keep. Fix to the body which contains the Spirit, a head and receiver, lute well the junctures, and with a small fire of sand distil about the half of this liquor, you shall have the rectified Spirit of the humane Head, which you may keep in a Bottle well stop'd.

It is very good for the Epilepsie, Apoplexy, Palsie, Lethargy, Hysterick fits, to cause Sweating, to resist Poison, for the palpitation of the Heart, for Vapours, and for the Scurvy. Its Dose is from four to twenty four drops.

The black Oil is very Resolvent, and proper for Vapours in Women, being held at the Nose. It is good also for the Epilepsie taken internally, from one drop to six: But because of its great stink it is seldom used.

Remarks.

The Retort which we use in this distillation must be only half full, because the Brain, which is a viscous substance, would rarefie too much by the heat of the fire, and fall in substance into the Receiver. For the same reason we use only a small fire during the first four or five hours, until the aqueous part, which is the lightest and easiest to be raised, be distilled, which we know when we see no more fall into the Receiver.

B b b 2

If

If you would separate the dry volatile Salt from the other principles, as in the distillation of *Vipers*, you must take away the Receiver, and pour out the phlegm which is in it before you encrease the fire. But as we have no other design than to make a spirituous liquor, we let both that which comes off first, and that which comes off last remain together in the Receiver.

There must be a pretty good fire to raise the volatile Salt and Oil of this substance, because its principles, altho' active, yet they are naturally closely united to its earthy parts: but when they are once separated, the volatile Salt rises with the least heat you can put under it.

The Spirit being separated from the Oil is rectified with a little fire, not only to purifie it from a red and stinking tincture, but also from its phlegm, which remains in the body after the distillation, and which is cast out as useless: for the liquor which comes off first contains the most volatile Salt, and by consequence is best, being the nature of the Spirit consists in the volatile Salt, with as great a quantity of phlegm as is necessary only to liquifie it.

The Vertues of the Oil come from a portion of the volatile Salt which is entangled in its branches: Its stink and black colour are caused by the fire, which burns it in these close vessels, so that the Soot which is exalted falls down to the bottom again.

You must throw away as useless, the earthy substance which remains in the Retort.

Anti-

Antiepileptick Elixir.

THIS Operation is a Spirit of the humane Head, which is mixed, and circulates with an equal weight of the *Spirit of Wine*, in which some of the volatile parts of *Opium* have been dissolved.

Cut in small pieces four or five ounces of *Opium*, put them in a Matrafs, pour upon them *Spirit of Wine* till it be four fingers breadth above them, stop the vessel exactly, put it in some hot place, and let the matter digest for four and twenty hours, shaking it from time to time, then filtrate this liquor, pour more *Spirit of Wine* upon the *Opium* which remains, and proceed as before to draw off all the Tincture, filtrate it, and having mixed it with the first, put them in a glass body, which must be only half full; fix to it a head and receiver, lute the junctures exactly, and distil by a gentle fire of sand almost all the *Spirit of Wine*, until that which remains in the bottom of the body be of the consistency of a Syrup.

Take of the *Spirit of Wine* drawn by distillation from the Tincture of *Opium*, mix it in a large Matrafs, with an equal weight of the *Spirit of humane Head* rectified: Stop the Matrafs with another Matrafs to make a double vessel, lute the junctures well, and place it upon a small fire of sand, to make the Spirits circulate together for two days, then the Operation is ended: let the vessels cool, and then unlute them: pour the liquor into a glass Bottle, and keep it for use. This is the *Antiepileptick Elixir*.

B b 3

This

Vertue.

This has the Vertue of the *English* drops, which have been so much esteemed for some time; it is good for the Epilepsie, Apoplexy, Delirium, and other diseases of the *Brain*, for the Scurvy, for suppressing of Vapours, for the Pleurisie, to excite Sweating, to resist Poison, to ease an obstinate Cough, Rheumatick Pains, Colick, Gout, Sciatick, for Madnes, the Hiccough, for want of Rest, to purifie the Blood. The Dose is from four drops to twenty in a proper liquor.

Dose.

Remarks.

We use in this *Elixir* some of the volatile and sudorifick parts of *Opium*, for which the *Spirit of Wine* is a very good dissolvent: for altho' we distil the Tincture of *Opium*, and that the *Spirit of Wine* comes off as clear as it was before it was poured upon the *Opium*, yet notwithstanding it retains the most subtile and purest substance of the *Opium*.

Laudanum.

The Extract which remains at the bottom of the body is a *Laudanum*, which must be thickned more, upon a little fire, if it be not thick enough, and kept for the same uses as ordinary *Laudanum*.

We put the Spirits to circulate together in a double vessel, to the end that they may be mixed and united exactly.

Those who have a prejudice at the *Spirit of the humane Head*, may use instead of it, the *Spirit of Harts-horn*.

CHAP.

CHAP. V.

Of Honey.

Honey is made of the most essential substance ^{How Ho-} of several Flowers, which the Bees separate, ^{ney is} and carry in to their Hives for their ^{made,} nourishment. To this *Virgil* alludes, in speaking of *Bees*, when he says,

*At fesse multa referunt se nocte minores,
Crura thymo plene pascuntur & arbuta passim,
Et glaucus salices Cassiamque, Crocumq; rubentem,
Et pinguem tiliam, & ferrugineos Hyacinthos.*

These little Insects having first, by an admirable artifice, made their Combs of Wax, divided into small squares, as shall be said in the Chapter of Wax, they fill them with Honey, as if they would lay up provision for the Winter.

There are two sorts of Honey, one *White*, and ^{How white} another *Yellow*. The *White* is separated without ^{Honey is} fire, lay new *Honey-combs* upon a hurdle, or ^{taken out of} branches of Willows laid a-cross one another, or in a cloth spread and fastned at the four corners, under which put some convenient vessels, there will run out of the *Honey-combs* an excellent, *White*, and pleasant *Honey*, which afterwards will congeal.

White Honey may be also pressed out of the *Combs*, but then it is not so fine.

B b b 4

The

Choice Ho-
ney of
Narbonne.

The finest *Honey*, the best and most agreeable to the taste, is that which comes from *Langue-dor*, which they call *Honey of Narbonne*, it should be White, Thick, New, and have a little Aromatick Smell, of a sweet and a little sharp taste. It is used only for eating. That which distinguishes this *Honey* from others is, That in this Countrey the Bees suck principally Rose-mary Flowers, which are in great abundance, and which have great vertue there.

Yellow
Honey.

Yellow Honey is taken out of all sorts of Combs, whether filled with new or old *Honey*, which, being taken out of the Hives, are bruised and heated with a little water, then putting them in a thin Linen Bag, they are put into the press to press out the *Honey*: the Wax remains in the Bag, but there always passes a little of it, for it is found in the *Honey* when it is distilled.

Yellow Honey is the most common, it is made in all Countries. Some pretend that the best comes from *Champaigne*: It should be new, and Candied, of a pretty thick consistence, of a golden yellow colour, and of a pleasant Smell. The *Alchymists* seek for Gold in it, because of its colour, which is nigh to that of this Metal: They think also to find a great deal of the Universal Spirit in it, because it is drawn from Flowers, where they believe the Spirit is condensed in a greater quantity than any where else.

Vertue.

White Honey is pectoral, it expectorates, it helps respiration, it strengthens, and is laxative.

Yellow Honey is detensive, laxative, digestive, attenuating and dissolving.

Hydromel.

Honey dissolved in water is called *Hydromel*: It may be made spirituous in the following manner.

Vinous

Vinous Hydromel.

THIS Operation is *Honey* dissolved in Water, and made spirituous by Fermentation.

Mix together in a large Bason eight pounds of fine white *Honey*, and forty pints of Water, boil them upon a gentle fire, skim them until they have acquired the consistence of a liquor so thick that an Egg may swim on it: then pour this liquor into a Barrel which must be only two thirds full: Stop the bung of the Barrel only with Paper, place it in the Sun or in a Stove, and let it remain there for a Month, or six Weeks, or until the liquor ceases to ferment. In the mean time, shake the Barrel from time to time to excite the Fermentation: Then carry the Barrel to a Cellar, and having stoppt it well, keep this liquor, which shall be spirituous, and very like in every thing to *Spanish Wine*, except that it is a little more delicious.

Vinous Hydromel fortifies the Stomach, rejoices the Heart, it is good for a windy Colick, it helps breathing, it relists ill Air, it is used more for drinking than for Medicin: The Dose is half a glass.

Remarks.

White *Honey* is better for this Operation than ordinary *Honey*, because it tastes better, and the *Hydromel* shall be clearer and finer: *Honey* of *Narbonne* is better for this use than any other, but

but as it is not common, you may use instead of it White Honey, the finest you can get.

Ordinary
Hydromel.

The *Hydromel* must boil till an Egg can swim in it; for by this mark we know that the liquor is boiled to a sufficient consistency for keeping: if it were too clear, the Egg would fall to the bottom.

Melicrat.
Mulla,
Apomeli.

Till now we have had only the ordinary *Hydromel*, called by the ancients *Melicratum* or *Mulla*, or *Apomeli*, but by fermentation it becomes spirituous.

The Barrel must be only two thirds full, to the end that the liquor may have room enough to ferment, and that none of it may be spilt: during the fermentation, the bung of the Barrel must be only stoppt with a piece of Paper or Linen lest the Fermentation should burst it: But when this is over, the Barrel must be stoppt as is usual. If you would fill it first with spirituous *Hydromel*, as they do with Tuns of Wine, it will keep the better.

The heat of the Sun is better than that of Stoves to excite the Fermentation of *Hydromel*: But because it can be had only a part of the day, the Operation is more quickly performed, when the Barrel is placed in a Stove which is hot both day and night.

Explana-
tion of the
fermenta-
tion of
Hydromel.

For explaining the Fermentation of *Hydromel*, you must know that Honey contains naturally an acid, essential Salt and Oil. This Salt is put in motion by the heat, and it endeavours to get loose, but it finds an oily substance which retains it; therefore it acts upoa this Oil, and rarefies and divides its parts, that it may have a free motion. This causes a Fermentation, from whence there comes

comes a *Vinous Spirit*, because the Oil being attenuated and exalted by the Salt becomes spirituous.

When the *Hydromel* is become spirituous the Fermentation ceases, because the acid Salts, which are as so many little knives having divided all that which opposes their motion, they have no more to do, and consequently there is no more rarefaction in the liquor.

The Fermentation of *Hydromel* is performed after the same manner as that of *Spanish Wine*, because the same principles, and the same disposition of parts are to be found in both; yet there is this difference, That in the juice of Grapes there is a greater quantity of Salt than in *Hydromel*; therefore the Fermentation is quicker, tho' it be not assisted with the heat of the Sun or Stove.

Vinous Hydromel may be drunk as *Spanish Wine*, and if it be taken to excess, it fuddles as it does. The *Hollanders* and other Nations which inhabit cold Countries, where the Grapes acquire not the quality and maturity requisite for making of Wine, make a *Vinous Hydromel* much more frequently than we in *France* do.

For satisfying curiosity, an inflammable Spirit may be drawn from *Hydromel*, as that which is drawn from Wine by distillation. It does not yield so great a quantity as Wine does, yet it has the same qualities.

Vulnerary *Hydromels* are often made of decoctions of vulnerary Herbs and a little Honey, which are given for drink to those who have any distemper of the Lungs.

Vinegar

Philosophi-
cal Vine-
gar.

Vinegar of *Honey* may be made, by putting into *Vinous Hydromel* from which the Spirit has been drawn by distillation, a knot of *Roquet-Seed* bruised, and leaving it to ferment. This some call Philosophical Vinegar.

Distillation of *Honey*.

THIS preparation is a separation of the Water, the Spirit, and the Oil of *Honey* from its terrestrious part.

Put four pounds of good *Honey* into a large earthen body, and distil the water in a moderate Sand-heat, until acid drops begin to come; then take away the fire, and keep this water in a bottle; you shall have twenty five ounces of it. It is good to make the hair grow, you must either wet your Comb with it every day, or else dip a piece of Sponge into it, and therewith soak the roots of the hair.

Take that which remains in the Body, put it into an earthen Retort, or glass one Coated, but one that's large enough for two thirds to remain empty, and place your Retort in a Reverberatory Furnace; then fitting a large Receiver, and luting the joints, begin the distillation with a small fire for three hours only to warm the Retort; then encrease it by little and little, Spirits will come forth with a little black Oil, and fill the Receiver with Clouds; continue the fire until all is come out that will, unlute the vessels, and separate the Spirit from the black and stinking Oil in a Tunnel lined with brown Paper, (there is but very little Oil) keep them both in Vials: you will have twelve ounces of Spirit.

Spirit of
Honey.

Oil.

The *Spirit* is an excellent *Aperitive*, some of it *Verm.* may be dropt into *Juleps*, to give them an agreeable acidity.

The *Spirit* may be Rectified by distilling it in *Refifica-* Sand in a glass Body, and that which rises last may *tion.* be kept apart as the strongest of all; it is used for to cleanse old Ulcers, and to eat proud flesh.

The *Oil* is good to be used in *caries* of bones.

You will have in the Retort six and twenty *Weight.* ounces of a very black spongy matter, which is inflammable by reason of a foot that remains in it; when it is burnt it yields but very few ashes, out of which nothing can be drawn.

Remarks.

The Vessels must be exceeding large for the *Distillation of Honey*, because a great vacuity is requisite for it to rarefie in.

The water which is first distilled is called the *Dew of Honey*, but it uses to be distilled in a *Balneum Vaporis*.

The *Water of Honey* makes the Hair to grow, because it opens the Pores; some do mix it with the Juice of *Onion* to render it the more effectual.

Sometimes a little *wax* is found in the Receiver, which came with the *Spirit* from the *Honey* in the distillation.

CHAP.

CHAP. VI.

Of Wax.

Wax
whence it is.

WAX is an oily substance which *Bees* draw from Flowers in the Springs; and which they bring home to their Hives, in small rolls about their Legs; they make their Cells very artificially of them, which are separated from one another by small, thin, and transparent walls, but which are also joined together. In these Cells the *Bees* both lay Eggs for producing other *Bees*, and also lay up the *Honey* which they have gathered.

Different
colours of
Wax.

This *Wax* is White the first year, Yellow the second, and Brown the third; it also blackens when it has been long in the Hive, but then the *Bees* never use either for *Honey*, or for hatching young ones.

Propolis, or
Virgin-
wax.

There is also found in Hives a kind of Red *Wax*, or rather a Natural Mastic, called *Propolis* or *Virgin-wax*, which the *Bees* used to stop holes and clefts of their Hives with.

How Wax
is separated
from Ho-
ney.

Wax is separated from the *Honey* by squeezing the Combs, for the *Honey* runneth out and the *Wax* remains: But because the Combs contain always some impurities, therefore they dissolve them in a Basen, and add water for cleaning of them, then they squeeze the whole through a Cloath, skim it, and leave it to cool: And when they have separated it from the water, it is dissolved a second time, and so cast into a mould.
This

This is the Yellow *wax* which is sold in Drug-^{Choice.} shops: it should be hard, compact, easie to break, clean, of a fair Yellow colour, and of an agreeable odour.

It is softning and dissolving, it is used in plasters and ointment to give them a consistency. ^{Virtue.}

White *wax* is a preparation of Yellow *wax*,^{Preparation} which is melted upon the fire, and washed several times in water; then it is divided into parcels, which are kneaded out into a good breadth and exposed to the Air and Dew for six or seven Months, that is, from the Spring to the Harvest, until that it has changed the Yellow into a fair White colour. This White *wax* is made in many Provinces, but the best and fairest is made in *Britaigne*. When it is good it is pure, very white, clear, transparent, hard, brittle, insipid to the taste, and does not stick to the Teeth when it is chewed. ^{of White Wax.}

It is softning, but less dissolving than the Yellow, because the washing it has carried off a great part of its Salt. ^{Virtue.}

There is another preparation of White *wax*, by dissolving and beating it with Rods, whilst cold water is cast upon it: Its whiteness is encreased by this rarefaction, and it is made more proper for *Pomatus*.

Distillation of Wax.

THIS Operation is a separation of the Oil of *wax*, from the Phlegm and Salt.

Melt two pounds of Yellow *wax* in an earthen pan, and mix with it three or four pounds of potters earth powdered, or so much as is requisite to make

Spirit of
Wax.

Butter of
Wax.
Vertue.
Dose.

Vertue of
the Butter
of Wax.

Rectifica-
tion of the
Butter of
Wax into
an Oil.

make a Paste of it, form it into little pellets, and put them into an earthen Retort, or glass one Coated, a third of which remains empty; place this Retort in a Reverberatory Furnace; fit to it a Receiver, and luting the joints, give a small fire at first, and there will come forth *Phlegm*, then a *Spirit*; encrease the fire a little, and a liquor will distil that congeals in the Receiver like *Butter*; continue the fire till nothing more comes forth; then unlute the joints, separate the *Spirit* mixed with *Phlegm* from the *Butter*, and keep it in a Vial well stoppt. It is a good opener; The Dose is from ten drops to thirty in *raddish* water, or some other appropriate liquor.

There will remain in the Retort the fat Earth, blackned by the Soot of the *Wax* which falls upon it, which you must take out and cast away as useless.

The *Butter of Wax* is a good dissolvent for Tumors, cold Humors, pains of the Joints, Palsie, Chilblains, Ulcers in the Breast: Many prefer it to the Oil of *Wax*, which properly is only a rectification of *Butter*, whereof take the following description.

Melt upon a small fire the *Butter of Wax* in an earthen Vessel, add to it *Quick-lime* newly powdered as much as may serve to make a hard Paste of it, put this Paste into the same Retort which was used in the distillation of the *Butter of Wax*, set the Retort upon a Furnace, fit a Receiver to it, and having luted the junctures exactly, put under it a fire of the first degree: When the Vessel is heated, augment it unto the second degree, there will first come forth a little *Phlegm*, and then a clear Oil; continue to encrease the fire

fire until there drop no more; leave the Vessels to cool, then separate them, and you shall find in the Receiver the *Oil of Wax* clear, but mixt with a little Water, which must be separated and kept.

The *Oil of Wax* hath the same Vertue as the *Vertue, Spirit* for external applications, but it penetrates a little better, it may be also used inwardly; it is very Diuretick, good for the Stone, the Nephritick Colick, ulcers of the Reins and Bladder, retention of Urin, and attenuating of Phlegms. The Dose is from two drops to ten in white Dose, Wine, or the waters of Pellitory and Raddish.

Remarks.

There is no Earth in *Wax*, so that if you put it into the Retort alone, it would distil in the same quantity that it was put in, and of a like substance: But the Powder of Potter's Earth or *Quick-lime* is mixed with it, that being by this means rarefied and extended, its principles may be the better separated. Brick, Bole, or Ashes, may serve to the same purpose.

The solid consistence of *Wax* doth proceed from a proportionate mixture of *Water, Volatile Salt* and *Oil*, united and incorporated together; wherefore its solidity comes to be destroyed, according as the *Principles* do suffer a separation; and this is easily observed in the *Rectifications*, for in every distillation that is made, some considerable quantity of water is separated, and the *Oil* does likewise become clearer.

If by way of curiosity you desire to know exactly what quantity of liquor, or Spirit, can be

C c c

drawn

drawn from *Wax*, you must dry your *Clay* as much as you can, or else use in its place, broken Pots, or Bricks powdered, which are not at all wet: out of two and thirty ounces of *Wax* you'll draw in the first distillation just the same weight of liquor; to wit, twelve ounces of *Phlegmatick Spirit*, and the rest is a *Butter*.

Another
rectifica-
tion of the
Butter of
Wax.

The *Butter of Wax* may be rectified and reduced to a clear *Oil* by cohobating it several times, and mixing at each distillation new *Clay* or *Bole* powdered: but shall succeed better by using *Lime*, for at one distillation, after the manner that I have described, there may be more clear *Oil* drawn than by four distillations of any other method. The reason of it is, Because the igneous particles of the *Lime* are mixed with it, and have rarefied it. Moreover, this rectification renders the *Oil of Wax* more penetrating, and a greater dissolvent than others.

The *Butter of Wax* sometimes rectifies it self in the great heats of Summer; for I have often found, when I uncovered the glass pot in which I kept it, that the *Oil* has been separated clear from its phlegmatick or spirituous part.

Some considerable quantity of this spirituous Liquor may be drawn by the rectifications of the *Butter of Wax*, with *Clay* or *Bole*, or by the heat of Summer, as I have said: but it is not so when it is made with *Lime*, for then there is but a small quantity of *Phlegm*, because the *Quicklime* doth absorb all that humidity, and breaks the keeness of it; It is true, the fire forceth up some, but then it is deprived of its active principles.

The *Spirit of Wax* is only a small quantity of acid Volatile Salt dissolved in *Phlegm*; but you must not believe

believe what some have written, that having distilled a considerable quantity of *Wax*, and put that which was drawn into a Bolt-head, they could sublime the Volatile Salt like others of that nature. For this Salt, though it be indeed a Volatile, yet it is not Volatile enough to rise before the *Pblegm*; it is an acid Salt much like unto that of *Ambar*, but it is not of the nature of Volatile Alkali's, which are known to sublime so easily; it were better therefore to keep this Spirit as it is, or else to evaporate about half of it with a very mild heat, that it may be the stronger.

The Volatile Salts of many sulphureous matters are drawn acid, as they are in the mixt, because being clothed with soft and ramous parts which give way easily to their motion, they do not break their natural keenness by endeavouring to separate, when they are forced to it by fire, and so they do not receive so much terrestrious and fiery matter, as is requisite to make them porous, like Volatile Alkali's.

This Operation, and that of the Distillation of *Ambar* which I have described, do much confirm what I said before in my *Remarks* upon the *Principle*, that all the Salt of mixt bodies is naturally acid, and that Alkali is nothing else but an alteration of the Natural Salt, made by fire. Besides, all sorts of Experiments do seem to me to confirm and establish this opinion; but yet I am not so peremptory in the vindication of it, but that I would gladly give place to another, if I could be shewed that it is better than mine, for I seek after nothing so much as to discover Truth.

C c c a

THE

THE
VERTUES
OF THE
Several Remedies

Described in This

BOOK.

MANY have asked of me such a Table as that which follows, which I judge may be of use; but I am obliged to advertise those who shall read this BOOK, That they must not use the Remedies prescribed without precaution, tho' the Doses of them be set down: for seeing there are very many different temperaments and constitutions, it is impossible to make general Rules, which may serve for all without exception.

The same Remedy may have a good effect upon one, which will be of dangerous consequence for another, because the one requires a great Dose, and the other a small one. Some must be prepared to receive certain Medicines, and others have no need of any such preparation: There is one time proper

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for

for one, and another for another: Wherefore, the Prudence and Skill of a Physician is necessary for examining the circumstances of Persons, and for administering their Remedies in their proper seasons; he only can discern the Time when Nature endeavours to throw off the burthen which is upon it; and when it is proper to assist it; *Qua natura vergit, ea ducere oportet.* This is the main thing to be considered, without which the end can hardly be obtained.

Vomitives.

TOrbith Mineral, the Dose is from two grains to six.

Regulus of common Antimony, and also with Mars, the Dose is from four to eight grains.

Golden Sulphur of Antimony, the Dose is from two grains to six.

Glass of Antimony, the Dose is from two grains to six.

Liver of Antimony, or, *Crocus Metallorum*, the Dose is from four grains to eight.

Wine Emotick, the Dose is from half an ounce to three ounces.

Flowers of Antimony, the Dose is from two grains to six.

Powder of Algaroth, the Dose is from two grains to six.

Gilla Vitrioli, the Dose is from ten grains to a drachm.

Salt

Salt of Vitriol, the Dose is from ten grains to thirty.

Tartar Emetick, the Dose is from three grains to ten.

Tartar Emetick soluble, the Dose is from four grains to fifteen.

Spirit of Tabaco, the Dose is from two drachms to six.

Green precipitated Mercury, the Dose is from two grains to six.

To stop Vomiting.

A *Urion Fulminans*, the Dose is from two grains to six.

Extract of Mars astringent, the Dose is from ten grains to two scruples.

Mars diaphoretick, the Dose is from ten to twenty grains.

Antimony diaphoretick, the Dose is from six grains to thirty.

Bezoar Mineral, the Dose is from four grains to sixteen.

Coral prepared, the Dose is from ten grains to a drachm.

Sal Polychrest of Rochel, the Dose is from one drachm to six.

Succinum, or, *Ambar*, the Dose is from ten grains to half a drachm.

Ambar-greese, the Dose is from two to twelve drops.

Essence of Cinnamon, the Dose is a drop.

Essence of Cloves, the Dose is from one drop to three.

Oil of Muscade, applied to the Stomach.

Cream of Tartar, the Dose is from half a drachm to three.

Distilled Vinegar, the Dose is half a spoonful.

Hungary-water, applied to the Nose, Temples and Stomach.

Laudanum, the Dose is from half a grain to two grains.

Francfort Pills, the Dose is from fifteen grains to a drachm.

Ictericus's Cordial, the Dose is from six grains to thirty.

Elixir Proprietatis, the Dose is from seven to twelve drops.

Flowers of Benjamin, the Dose is from two to five grains.

Purgatives.

Crystal of the Moon, the Dose is from two grains to six.

Sweet Sublimate, the Dose is from six grains to thirty.

Perpetual Pill.

Sal Ielychrestum, the Dose is from one drachm to six.

Tartarum Vitriolatum, the Dose is from eight grains to thirty.

Crystal

Crystal of Tartar, the Dose is from half a drachm to three drachms.

Soluble Tartar, the Dose is from a scruple to a drachm.

Jalap, the Dose is from ten grains to a drachm.

Resins of Jalap and Scammony, the Dose is from four grains to twelve.

Rhubarb, the Dose is from fifteen grains to a drachm.

Extract of Rhubarb, the Dose is from ten grains to two scruples.

Extract of Aloes, the Dose is from fifteen grains to a drachm.

Extractum Panchymagogum, the Dose is from one scruple to two.

Cornachine Powder, the Dose is from fifteen to forty grains.

Magistery, or, the precipitate of *Antimony*, the Dose is from four to twelve grains.

The pale red precipitate of Mercury, the Dose is from four grains to ten.

Extract of Roses, the Dose is from half a drachm to two drachms.

An infusion of Muscad Roses.

Honey.

Astringents for stopping a Diarrhea.

Lientery, Dysentery, Hemorrhoids, Terms, bleeding at the Nose; Spitting of blood, and other hemorrhagies.

The Decoction of *Plantane*,

Sal

Sal Saturni, the Dose is from two to four grains.

Saffron of Mars astringent, the Dose is from fifteen grains to a drachm.

Extract of Mars Astringent, the Dose is from ten grains to two scruples.

Antimony Diaphoretick, the Dose is from six grains to thirty.

The *Antibetick* of *Poterius*, the Dose is from ten grains to two scruples.

Prepared Coral, the Dose is from ten grains to a drachm.

Styptick Water, the Dose is from half a drachm to two drachms.

Ambar, the Dose is from ten grains to half a drachm.

Rhubarb, the Dose is from a scruple to a drachm.

Extract of Rhubarb, the Dose is from ten grains to two scruples.

Millifolium.

Mouſſear.

Poterius's, Cordial, the Dose is from six grains to thirty.

Olibanum, the Dose is from a scruple to a drachm.

Uſnea Cranii Humani.

Distilled Vinegar, the Dose is half a spoonful.

Laudanum, the Dose is from half a grain to two grains.

Sal Polychrest of Rochel, the Dose is from a drachm to six.

Spirit of Sugar, the Dose is from four to ten drops.

Acquis

Acorns and their Caps, the Dose is from a scruple to four.

Oil of Acorns, the Dose is from two drachms to an ounce.

The shavings of *Harts-horn* made into a *Ptisan*.

The *Jelly of Harts-horn*, for Nourishment.

A *Ptisan* of the greater and lesser *Comfrey*.

The decoction of *Agrimony*.

Rose Water, the Dose is from one ounce to six.

Conserve of Cynorrhodon.

A decoction of the Seed of *Cynorrhodon*.

Provence Roses.

Orpin.

Sudorificks.

A *Urum fulminans*, the Dose is from two to six grains.

Tincture of the Moon, the Dose is from six to sixteen drops.

Burning Spirit of Saturn, the Dose is from eight to sixteen drops.

Antimony Diaphoretick, the Dose is from six to thirty grains.

Bezoar Mineral, the Dose is from six to twenty grains.

Sal Armoniack, and the *Salt of Tartar* given separately, but immediately the one after the other, the Dose is from four to ten grains of each.

The Spirit of Humane Skull, the Dose is from four to twenty four drops.

Antiepileptick

Antiepileptick Elixir, the Dose is from four to twenty drops.

Volatile Spirit of Sal Armoniack, the Dose is from six to twenty drops.

Decoction of Veronica or Speedwel.

The Water of Carduus Benedictus and Balm, the Dose is from two to six ounces.

Extracts of Balm and Carduus benedictus, the Dose is from a scruple to a drachm.

Salts of Carduus benedictus and Balm, the Dose is from ten grains to a scruple.

Volatile Salts of Tartar, Vipers, humane skull, blood, urine, hair, harts-horn, Ivory, the Dose is from six to sixteen grains.

The Spirits of all these, the Dose is from ten to thirty drops.

Powder of Vipers, the Dose is from eight to thirty grains.

Bezoar Animal, the Dose is from four to twenty grains.

Tincture of Antimony, the Dose is from four drops to twenty.

The Water of Walnuts, called water of three Nuts, the Dose is from one ounce to seven.

Extract of Walnuts, the Dose is from a scruple to a drachm.

Volatile Aromatick Oily Salt, the Dose is from four grains to fifteen.

Volatile Aromatick Oily Spirit, the Dose is from six drops to twenty.

Sudorifick Water of Vipers, the Dose is from one drachm to half an ounce.

Resin of Ambar, the Dose is from six grains to fifteen.

Ens Veneris, the Dose is from six grains to a scruple.

Poterius's Cordial, the Dose is from six grains to thirty.

Olibanum, the Dose is from a scruple to a drachm.

Causticks.

L *Apis Infernalis*, or Perpetual Caustick.

Vitriol, or Crystal of the Moon.

Vitriol of Venus.

Sublimate Corrosive.

Red Precipitate.

Oil of Mercury.

Butter, or icy Oil of Antimony.

Caustick Oil of Antimony.

Arsenick.

Caustick Arsenick.

Corrosive Oil of Arsenick.

Caustick Stone.

Oil of Vitriol.

Spirit of Nitre.

Aqua fortis.

Deterfives, or *Vulneraries* for Wounds and Ulcers.

Æ *Sustum*, or Burnt Copper.

Crocus of Copper.

Verdegrease.

Oil

Oil of Antimony made with Sugar.

Oil of Sugar.

Gun-shot-Water.

Decoction of Mugwort.

Decoction of Betony.

Decoction of Sanicle.

Decoction of Scrophularia Major.

Decoction of Fennil.

Decoction of Hypericum.

Birth-wort.

Oil of Turpentine.

Orpin.

Veronica, or Speedwel.

Little Centaury.

Millefolium.

Monsieur.

Tabaco.

Honey.

Olibannum.

Lapis Admirabilis.

Lapis Philosophorum.

Lapis Medicamentosus.

Oil of Benjamin.

Oil of Camphire.

Tincture of Myrrhe and Aloes.

Spirit of Honey.

Phagedenick Water.

Virgins Milk.

Desiccatives

Desiccatives to be applied outwardly.

Salt of Jupiter
Magistery of Bismuth.
Minium or Red Lead.
Cerule.
Burnt Lead.
Salt of Saturn.
Magistery of Saturn.
Balsom of Saturn.
Butter of Saturn.
Usnea Cranii humani.
Vitriol.
Colcothar.
Lapis Medicamentosus.
Lapis Philosophorum.
Stryptick Water.
Acorns and their cups.

Cosmeticks.

Magistery of Jupiter.
Flowers of Jupiter.
Magistery of Bismuth.
Magistery of Saturn.

For

For Contusions and Dislocations.

Vulnerary Water.
 Spirit of Wine.
 Queen of Hungary's water.
 Oil of Brick.
 Oil of Wax.
 Spirit of Volatile Salt Armoniack.
 Turpentine.
 Oil of Turpentine.

Dissolvents.

Scrophularia major.
 A Bag of decrepitated Salt.
 A Plate of Lead.
 Quick-silver.
 White Precipitate.
 Sweet Sublimate.
 Oil of Vipers.
 Fat of Vipers.
 Oil of Turpentine.
 Sulphur.
 Balsom of Sulphur.
 Oil of Tartar.
 Oil of Paper.
 Oil of Wax.
 Oil of Brick.
 Balsom of Saturn.

Queen

Queen of Hungary's Water.

Spirit of Wine.

Gumm Ammoniack.

Oil of Gumm Ammoniack.

Urine.

Gun-shot-water.

Mille-folium.

Mint.

Honey.

Oil of Humane Skull.

Against Tetters, Itch and Scurfs.

S *Alt of Saturn.*

White Precipitate.

Sweet Sublimate.

Spirit of Philosophick Vitriol.

Oil of Tartar per Deliquium.

Spirit of Tabaco.

Tincture of Antimony.

Red Precipitate Mercury.

Panacea Mercurialis.

Spirit of Venus.

Oil of Paper.

Phagedenick Water.

Flower of Sulphur.

Oil of Myrrhe.

Lapis Medicamentosus of Crollius.

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For

For whitening and cleansing the Skin from
all sorts of spots.

Strawberry Water.
Queen of Hungary's water.
Oil of Tartar per deliquium.
Virgins Milk.
The Liquor of fixt Nitre.
Oil of Acorns.
Oil of Filberds.
Snail-water.
Frogs-spawn Water.
Decoction of Orpin.

For a Cancer.

OIL of Wax.
Butter of Saturn.
Oil of Turpentine.

For a Gangrene.

Lapis admirabilis.
Vulnerary Water.
Lime Water.
Phagedenick Water.

Oil

Oil of Caustick Antimony.
Spirit of Wine.
Queen of Hungary's Water.
Volatile Spirit of Sal Armoniack.
Alom-Water.
Oil of Guaiacum, or, Lignum sanctum.
Spirit of Guaiacum.
Oil of Tartar.
Elixir Proprietatis.
Tincture of Myrrhe and Aloes.
Oil of Myrrhe.
Urine.
Oil of Benjamin.
Oil of Camphire.
Oil of Gumm Ammoniack.
Volatile Salts of Vipers, Harts-horn and Urine.
Spirit of Honey.
Oil of Brick.
Balsom of Saturn.
Birthwort.
Speedwel.
Mint.

Against the Kings-evil.

Spirit of Cochlearia, the Dose is from six drops to twenty.

Spirit of Cresses, the Dose is from fifteen drops to a drachm.

Salt of Tartar, the Dose is from six grains to fifteen.

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Tartar

Tartar Vitriolated, the Dose is from ten to thirty grains.

Panacea Mercurialis, the Dose is from six grains to two scruples.

Extractum Lanchymagogum, the Dose is from one grain to two.

Rosin of Jalap, the Dose is from four grains to twelve.

Sal Polychrestum, the Dose is from half a drachm to six drachms.

Diaphoretick Mineral, the Dose is from six to thirty grains.

Bezoar Mineral, the Dose is from six to twenty grains.

Bupthalmum, or, *Ox-Eye* into *Ptisan*.

The decoction of *Scrophularia major*.

*For the Plague, Malignant Fevers,
and Small Pox.*

A *Urum fulminans*, the Dose is from two to six grains.

Tincture of the Moon, the Dose is from six to sixteen drops.

Burning Spirit of Saturn, the Dose is from eight to sixteen drops.

Antimony Diaphoretick, the Dose is from six grains to thirty.

Bezoar Mineral, the Dose is from six to twenty grains.

Ens Veneris, the Dose is from six grains to a scruple.

Toterius's

Poterius's Cordial, the Dose is from six to thirty grains.

Spirit of humane Skull, the Dose is from four to twenty four drops.

Sal Armoniack, and *Salt of Tartar*, given separately, but immediately one after another, the Dose of each is from four to ten grains.

Flowers of Sal Armoniack, the Dose is from four to fifteen grains.

Volatile Spirit of Sal Armoniack, the Dose is from six to twenty drops.

Spirit of Sal Armoniack dulcified, the Dose is from twelve to thirty drops.

Acid Spirit of Sal Armoniack, the Dose is from four to ten drops.

Ambargrease, the Dose is from half a grain to four grains.

Essence of Ambargrease, the Dose is from two to twelve drops.

Shavings of Harts-horn and Ptisan.

Jelly of Harts-horn.

Water of a Harts-head, the Dose is from one ounce to four.

Tincture of Antimony, the Dose is from four drops to twenty.

Spirituos Water of Cinnamon, the Dose is from one drachm to three.

Oil, or *Essence of Cinnamon*, the Dose is one drop.

Tincture of Cinnamon, the Dose is from half a drachm to two drachms.

Cloves.

Essence of Cloves, the Dose is from one drop to three.

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Oil

Oil of Muscade, or, Nutmeg, the Dose is from four grains to ten.

Water of Carduus Benedictus and Balm, the Dose is from two ounces to six.

Extracts of Balm and Carduus Benedictus, the Dose is from one scruple to a drachm.

Olibanum, the Dose is from one scruple to a drachm.

Magisteriale, or, compounded Water of Balm, the Dose is from one drachm to an ounce.

Salts of Carduus Benedictus and Balm, the Dose is from ten grains to a scruple.

Distilled Vinegar, the Dose is half a Spoonful.

Tincture of Salt of Tartar, the Dose is from ten drops to thirty.

Volatile Salt of Tartar, the Dose is from six to fifteen grains.

Elixir i proprietatis, the Dose is from seven to twelve drops.

Flowers of Benjamin, the Dose is from two grains to five.

Myrrhe, the Dose is from ten grains to a scruple.

Tincture of Myrrhe, the Dose is from six drops to fifteen.

Powder of Vipers, the Dose is from eight grains to thirty.

Bezoar Animal, the Dose is from four grains to twenty.

Potavius's Antihætick, the Dose is from ten grains to two scruples.

Walnut Water, the Dose is from one ounce to seven.

Extract

Extract of Walnuts, the Dose is from one scruple to three.

Sal Volat. Oleos. the Dose is from four grains to fifteen.

Spir. Volat. Oleos. the Dose is from six to twenty drops.

Sudorifick Water of Vipers, the Dose is from one drachm to half an ounce.

Volatile Salts of Vipers, Humane Skull, Blood, Urin, Hair, Harts-horn and Ivory, the Dose is from six grains to sixteen.

Spirit of the same parts of Animals, the Dose is from ten to thirty drops.

Spirit of Gum Ammoniack, the Dose is from eight drops to sixteen.

Spirit of Camphire Wine, the Dose is from four drops to ten.

Queen of Hungary's Water, the Dose is from half a drachm to two drachms.

For the French Pox.

Flesh of *Vipers and Powder*, the Dose is from eight grains to thirty.

Volatile Salt of Vipers, the Dose is from six grains to sixteen.

Spirit of Vipers, the Dose is from ten drops to thirty.

Sudorifick Water of Vipers, the Dose is from one drachm to half an ounce.

Spirit of Guaiacum, the Dose is from half a drachm to a drachm and a half.

D d d 4

Antimony

Antimony Diaphoretick, the Dose is from six grains to thirty.

Tincture of Antimony, the Dose is from four drops to twenty.

Red Precipitate Mercury, the Dose is from four grains to twenty.

Green Precipitate Mercury, the Dose is from two to six grains.

Panacea Mercurialis, the Dose is from six grains to two scruples.

Extracts of Balm, Cardus Benedictus, Guaiacum, the Dose is from one scruple to a drachm.

Salts of the same Plants, the Dose is from eight grains to a scruple.

Crude Mercury made into an Ointment for Frictions.

Cinnabar for Fumigations.

Powder of Algaroth, the Dose is from a grain to six.

Sweet Sublimate, the Dose is from six grains to half a drachm.

White Precipitate, the Dose is from four to fifteen grains.

Turbith Mineral, the Dose is from two grains to six.

Aqua Mercurialis, the Dose is from three drachms to an ounce.

Cinnabar of Antimony, the Dose is from six grains to fifteen.

For a continual Salivation, or any other Disease occasioned by the Vapour of Mercury or Lead.

GOLD in Powder or Leaf, the Dose is from six grains to thirty.

Aurum Fulminans, the Dose is from two grains to six.

Poterius's Cordial, the Dose is from six grains to thirty.

For a Gonorrhea.

Turpentine, the Dose is from twenty grains to a drachm.

Spirit of Turpentine, the Dose is from four to twelve grains.

Red Precipitate Mercury, the Dose is from four grains to twenty.

Green Precipitate Mercury, the Dose is from two grains to six.

Panacea Mercurialis, the Dose is from six grains to two scruples.

Sweet Sublimate, the Dose is from six grains to thirty.

Crystal Mineral, the Dose is from twenty grains to thirty.

To

To stop a Gonorrhœa.

Poterius's Antihectick, the Dose is from ten grains to two scruples.

Lapis Medicamentosus for an Injection, a drachm for eight ounces of *Plantane-water*, or the water of a *Forge*.

Prepared Coral, the Dose is from ten grains to a drachm.

Ambar, the Dose is from ten grains to two scruples.

Crocus Martis Astringens, the Dose is from ten grains to a drachm.

Extract of Mars Astringent, the Dose is from one scruple to a drachm.

Laudanum, the Dose is from half a grain to two grains.

Salt of Saturn, the Dose is from one grain to four.

Antimony Diaphoretick, the Dose is from six grains to thirty.

Green Precipitate Mercury, the Dose is from two grains to six.

Mullefolium.

Injection of Lapis Admirabilis.

Injection of Lapis Philosophorum.

For Venereal Chankers.

Poalains, Anthimosi.
Red Precipitate.
Burnt-Alom.

Lapis

Lapis infernalis.

Green Precipitate of Mercury.

Panacea Mercurialis.

Cautick stone.

Oil of Mercury, applyed to the Sore.

Sweet Sublimate, the Dose is from six grains to thirty.

Decoction of Antimony.

Guaiacum.

Purgatives.

*Aperitives against a Dropsy, and the
hardness of the Spleen.*

C*rystals of the Moon, the Dose is from two grains to six.*

Saffron of Mars Aperitive, the Dose is from ten grains to two scruples.

Salt, or Vitriol of Mars, the Dose is from four grains to twelve.

Tincture of Mars, the Dose is from a drachm to half an ounce.

Extract of Mars Aperitive, the dose is from ten grains to two scruples.

Sweet Sublimate, the Dose is from six to thirty grains in a Pill.

Spirit of Salt, the Dose is from four drops to ten.

Salt-peter refined, the Dose is from ten grains to a drachm.

Sal Polychrestum, the Dose is from half a drachm to six drachms.

Salt

Salt of Sulphur, the Dose is from ten grains to two scruples.

Sal Armoniack, the Dose is from six grains to twenty four.

Acid Spirit of Sal Armoniack, the Dose is from four drops to eight.

Panacea Mercurialis, the Dose is from six grains to two scruples.

Salt of Nuts, the Dose is from six grains to a scruple.

Spirits of Salt, Vitriol, Sulphur, and Nitre Dulcified, the Dose is from four to ten drops.

Volatile Salt of Ambar, the Dose is from four grains to sixteen.

Spirit of Ambar, the Dose is from ten to twenty four drops.

Jalap, the Dose is from ten grains to a drachm.

Rosins of Jalap and Scammony, the Dose is from four grains to twelve.

Salts of Tamarisk and Wormwood, the Dose is from six grains to twenty four.

Spirit of Sugar, the Dose is from four to ten drops.

Crystal of Tartar, the Dose is from half a drachm to three drachms.

Soluble Tartar, the Dose is from three grains to a drachm.

Martial Tartar Soluble, the Dose is from ten grains to half a drachm.

Fixt Salt of Tartar, the Dose is from ten grains to thirty.

Tartar Vitriolated, the Dose is from ten grains to thirty.

Spirit of Turpentin, the Dose is from four drops to twelve.

Gunn

Gumm Ammoniack, the Dose is from ten to twenty four grains.

Spirit of Gumm Ammoniack, the Dose is from eight drops to sixteen.

Volatile Salt of Urine, the Dose is from six to sixteen grains.

Spirituons Water of Strawberries, the Dose is from half a spoonful to two spoonfuls.

Spirituons Water of Raspberries, the Dose is from half a spoonful to two spoonfuls.

Spirit of Cresses, the Dose is from fifteen drops to a drachm.

Spirit of Urine, the Dose is from eight to twenty four drops.

Spirit of Cochlearia, the Dose is from fifteen drops to a drachm.

Cornachin Powder, the Dose is from twenty to forty five grains.

Extract of Aloes, the Dose is from a scruple to a drachm.

Extractum Panchymagogum, the Dose is from ten grains to two scruples.

Rhubarb, the Dose is from fifteen grains to a drachm.

Vomitives.

Conserve of Cynorrhodon.

Little Centaury.

For

For a Squinzie.

Salt of Saturn in a Gargarism, one scruple to eight ounces of a proper Liquor.

Crystal Mineral, the Dose is from ten grains to a drachm.

Alom in a Gargarism, one drachm to eight ounces of a proper Liquor.

Spirits of Vitriol of Alom, the Dose is from four to eight drops.

Prepared Coral, the Dose is from ten grains to a drachm.

Hypochondriack Melancholy.

Burning Spirit of Saturn, the Dose is from eight to sixteen drops.

Tincture of Mars, the Dose is from one drachm to three.

Salt of Mars, the Dose is from four to twelve grains.

Extract of Mars Aperitive, the Dose is from ten grains to two scruples.

Saffron of Mars Aperitive, the Dose is from one scruple to a drachm.

Mars Diaphoretick, the Dose is from ten to twenty grains.

Salt-peter fixed by Coals, the Dose is from sixteen grains to thirty.

Volatile

Volatile Spirit of Sal Armoniack, the Dose is from six drops to twenty.

Flowers of Sal Armoniack, the Dose is from four to fifteen grains.

Root of black Hellebore dried, the Dose is from six grains to half a drachm.

Magisteriale, or, compounded Water of Balm, the Dose is from a drachm to an ounce.

Essence of Ambar-grease, the Dose is from two to twelve drops.

Oil of Cinnamon, the Dose is a drop.

Soluble Tartar, the Dose is from ten grains to two scruples.

Martial Tartar Soluble, the Dose is from ten grains to half a drachm.

Fixt Salt of Tartar, the Dose is from ten grains to thirty.

Volatile Salt of Tartar, the Dose is from six grains to fifteen.

Tincture of the Salt of Tartar, the Dose is from ten to thirty drops.

Tartar Vitriolated, the Dose is from ten to thirty grains.

Extractum Panchymagogum, the Dose is from one scruple to two.

Spirit of Gumm Ammoniack, the Dose is from eight to sixteen drops.

Powder of Vipers, the Dose is from eight grains to thirty.

Spirit of Raspberries, the Dose is from half a drachm to two drachms.

Tincture of Antimony, the Dose is from four drops to twenty.

Cornachine Powder, the Dose is from twenty to forty five grains.

Fer

For the Epilepsie, Palsie, Apoplexy and
Lethargy.

Spirit of Venus, the Dose is from four to eight
drops.

Glass of Antimony, the Dose is from two grains
to six.

Poterius's Cordial, the Dose is from six grains
to thirty.

Compounded Magisteriale Balm-water, the Dose
is from one drachm to an ounce.

Humane Skull, the Dose is from ten grains to
two scruples.

Oil of Humane Skull, the Dose is from one
drop to six.

Emetick Tartar soluble, the Dose is from four
to twenty grains.

Syrup Emetick, the Dose is from half an ounce
to two ounces.

Liver of Antimony, or, Crocus Metallorum,
the Dose is from two to eight grains.

Wine Emetick, the Dose is from half an ounce
to three ounces.

Flowers of Antimony, the Dose is from two
grains to six.

Powder of Algaroth, the Dose is from one
grain to six.

Cinnabar of Antimony, the Dose is from six
to fifteen grains.

Volatile Spirit of Sal Armoniack, the Dose is
from six drops to twenty.

Tincture of Ambar, the Dose is from ten
drops to a drachm.

Clear

Clear Oil of Ambar, the Dose is from one drop to four.

Oil of Guaiacum rectified, the Dose is from two drops to six.

The Waters of Balm and Carduus Benedictus, the Dose is from two to six ounces.

Extract of Balm and Carduus Benedictus, the Dose is from one scruple to a drachm.

Spirit of Wine, the Dose is from one drachm to three.

Queen of Hungary's Water, the Dose is from one drachm to two.

Spirit of Tartar, the Dose is from one drachm to three.

Spirit of Tabaco, it is a strong Vomitive, the Dose is from two drachms to six.

Gilla Virrioli, the Dose is from ten grains to a drachm.

A Clyster of Tabaco.

Butter of Wax applyed outwardly.

Olibanum, the Dose is from one scruple to a drachm.

Ufnea of Humane Skull.

Spirit of Man's Skull, the Dose is from four to twenty four drops.

Elixir Antiepileptick, the Dose is from four drops to twenty.

Tincture of Salt of Tartar, the Dose is from ten to thirty drops.

Volatile Salt of Tartar, the Dose is from six grains to fifteen.

Extractum Pauchymagogum, the Dose is from one scruple to two.

Spirit of Camphire Wine, the Dose is from half a drachm to a drachm.

E e e

Tincture

Tincture of Myrre, the Dose is from six drops to fifteen.

Volatile Salts of Vipers, Harts-horn, Ivory, Man's Blood, Urin, Skull, Hair, the Dose is from six to sixteen grains.

Spirit of these Animals, the Dose is from ten to thirty drops.

Oil of Bricks, applyed outwardly.

Sal Volatile Oleosum, the Dose is from four to fifteen grains.

Spiritus Volatilis Oleosus, the Dose is from six drops to twenty.

Ens Veneris, the Dose is from six grains to a scruple.

For a Quartan Fever.

M*ARS Diaphoretick*, the Dose is from ten to twenty grains.

Salt of Mars, the Dose is from four to twelve grains.

Tincture of Mars, the Dose is from one drachm to half an ounce.

Extract of Mars, the Dose is from ten grains to two scruples.

Sweet Sublimate, the Dose is from six to thirty grains.

Golden Sulphur of Antimony, the Dose is from two grains to six.

Glass of Antimony, the Dose is from two grains to six.

Syrup Emetick, the Dose is from two drachms to an ounce and an half.

Crocus

Croci Metallorum, the Dose is from two to eight grains.

Wine Emetick, the Dose is from half an ounce to three ounces.

Gilla Vitrioli, the Dose is from twenty grains to a drachm.

Tartar Emetick soluble, the Dose is from four to twenty grains.

Cornachine Powder, the Dose is from twenty to forty five grains.

Flowers of Antimony, the Dose is from two grains to six.

Powder of Algaroth, the Dose is from two grains to six.

Water of Nuts, the Dose is from one ounce to seven.

Extract of Nuts, the Dose is from one scruple to a drachm.

Salt of Nuts, the Dose is from six grains to a scruple.

Nitre fixt by Coals, the Dose is from sixteen to thirty grains.

Flowers of Sal Armoniack, the Dose is from six to twenty grains.

Volatile Spirit of Sal Armoniack, the Dose is from six drops to twenty.

Fixt Febrifugous Salt of Sal Armoniack, the Dose is from eight grains to thirty.

Sal Armoniack and Salt of Tartar, given separately, immediately one after another, the Dose is from four grains to eight of each.

Peruvian Bark, the Dose is from half a drachm to two drachms.

Tincture of the Peruvian Bark, made with Wine or Water, the Dose is from one ounce to three.

E e e 2

Tincture

Tincture of Peruvian Bark, made with *Spirit of Wine*, the Dose is from ten drops to a drachm.

The Febrifugous Rosa sola, the Dose is from half a drachm to two drachms.

Extract of the Peruvian Bark, the Dose is from twelve grains to half a drachm.

Salt of the Peruvian Bark, the Dose is from ten grains to a scruple.

Crystal of Tartar, the Dose is from half a drachm to three.

Soluble Tartar, the Dose is from ten grains to two scruples.

Soluble Tartar of Mars, the Dose is from ten grains to half a drachm.

Salt of Tartar, the Dose is from ten to thirty grains.

Vitriolated Tartar, the Dose is from ten to thirty grains.

Volatile Salts of Tartar and Urine, the Dose is from six grains to fifteen.

Extractum Panchymagogum, the Dose is from one scruple to two.

Spirit of Gum Ammoniack, the Dose is from eight to sixteen drops.

Camphire hung about the Neck or Arms, two drachms.

Lesser Centaury in Infusion.

Against Tertian and double Tertian Fevers.

Soluble Emetick Tartar, the Dose is from four to sixteen grains.

Gilla Vitrioli, the Dose is from twenty grains to a drachm.

Salt.

Saltpeter Purified, the Dose is from ten grains to a drachm.

Sal Polychrestum of Rochelle, the Dose is from one drachm to six.

Salt of Sulphur, the Dose is from ten grains to two scruples.

Spirit of Nitre Dulcified, the Dose is from four to eight drops.

The Acid Spirit of Sal Armoniack, Vitriol, Alom, and Sulphur, the Dose is from four to eight drops.

The Peruvian Bark, the Dose is from half a drachm to two drachms.

Tincture of Peruvian Bark, made with Wine or Water, the Dose is from one ounce to three.

Tincture of the Peruvian Bark made with the Spirit of Wine, the Dose is from ten drops to a drachm.

Febrifugous Rosa Solis, the Dose is from one drachm to two.

Water of Nuts, the Dose is from one ounce to seven.

Extract of Nuts, the Dose is from a scruple to a drachm.

Salt of Nuts, the Dose is from six grains to a scruple.

Extract of the Peruvian Bark, the Dose is from twelve grains to half a drachm.

Salt of the Peruvian Bark, the Dose is from ten grains to a scruple.

Lesser Centaury in Infusion.

Crystal of Tartar, the Dose is from half a drachm to three drachms.

Camphire applyed to the Arm, or hung about the Neck,

E e e 3

Against

Against continued Fevers.

Salt-peter Purified, or Crystal Mineral, the Dose is from ten grains to a drachm.

Sal Polychrestum of Rochelle, the Dose is from drachm to six.

Salt of Sulphur, the Dose is from ten grains to two scruples.

Spirits of Vitriol, Alom, and Sulphur, the Dose is from four to eight drops.

Crystal of Tartar, the Dose is from half a drachm to three drachms.

Soluble Emetick Tartar, the Dose is from four to sixteen grains.

Vinum Emeticum, the Dose is from half an ounce to three ounces.

Laudanum, the Dose is from half a grain to two grains.

Against Rheumatism.

Spirit of Cresses, the Dose is from fifteen grains to a drachm.

Tartarum Vitriolatum, the Dose is from ten grains to half a drachm.

Soluble Tartar, the Dose is from a scruple to a drachm.

Spirit of Salt, the Dose is from four to eight drops.

Antiepileptick

Antiepileptick Elixir, the Dose is from four drops to twenty.

Laudanum, the Dose is from half a grain to three grains.

Powder of Vipers, the Dose is from eight to thirty grains.

Sudorifick Water of Vipers, the Dose is from a drachm to half an ounce.

Mercurial Panacea, the Dose is from six grains to thirty.

Sweet Sublimate Mercury, the Dose is from six to twenty grains.

Antimonium Diaphoreticum, the Dose is from six to thirty grains.

Aurum fulminans, the Dose is from two to six grains.

Spirit of Wine.

Queen of Hungaries Water, applied externally.

Oil of Turpentine.

Spirit of Urine.

Spirit of Sal Armoniack.

Oil of Bricks.

Oil of Wax.

Oil of Vipers.

Oil of Nutmegs.

Vulnery Water for gunshot Wounds.

Against Worms.

P*anacea Mercurialis*, the Dose is from six grains to two scruples.

E e e 4

Sweet

Sweet Sublimate Mercury, the Dose is from four to thirty grains.

Precipitate of the colour of Roses, the Dose is from four to twenty grains.

Lesser Centaury.

Raspings of Harts-horn in a Pilsan, and in Powder, the Dose is from ten grains to a drachm.

Rhubarb, the Dose is from twelve grains to a Drachm.

Extract of Rhubarb, the Dose is from ten grains to two scruples.

Extract of Aloes, the Dose is from fifteen grains to a drachm.

Against the Scurvy.

Tincture of Flint-stones, the Dose is from ten to thirty drops.

Antimonium Diaphoreticum, the Dose is from six grains to thirty.

Sweet Sublimate Mercury, the Dose is from six to thirty grains.

Diaphoretick Mars, the Dose is from ten to twenty grains.

Aperitive Saffron of Mars, the Dose is from ten grains to two scruples.

Prepared Coral, the Dose is from ten grains to a drachm.

Volatile Spirit of Sal Armoniack, the Dose is from six drops to twenty.

Volatile Salt of Ambar, the Dose is from four grains to sixteen.

Spirit

Spirit of Ambar, the Dose is from one to four drops.

Water of Cresses, the Dose is from fifteen drops to a drachm.

Spirit of Scurvygrass, the Dose is from ten drops to a drachm.

Ens Veneris, the Dose is from six grains to a scruple.

Lesser Centaury.

Antiepileptick Elixir, the Dose is from four to twenty drops.

Spirit of Humane Head, the Dose is from four to four and twenty drops.

Tincture of Antimony, the Dose is from four drops to twenty.

Sal Volatile Oleosum, the Dose is from four grains to fifteen.

Spiritus Volatilis Oleosus, the Dose is from six drops to twenty.

Spirit of Guaiacum, the Dose is from half a drachm to a drachm and a half.

Tartarum Vitriolatum, the Dose is from ten grains to thirty.

Volatile Salts of Tartar, Urine, Vipers, and Harts-horn, the Dose is from six to fifteen grains.

Spirit of Gum Ammoniack, the Dose is from eight to sixteen drops.

Precipitate of Mercury of the colour of Pale Roses, the Dose is from four to ten grains.

Panacea Mercurialis, the Dose is from six grains to two scruples.

Water for Gun-shot Wounds, applied externally.

The admirable Stone, applyed externally.

Against

Against Deafness.

OIL of Bricks.

Oil of Paper.

Brandy.

Spirit of Wine.

Queen of Hungary's Water.

Black Oil of Tartar.

Dropt in
the Ear.

Against the Tooth-ach.

OIL of Cloves.

Oil of Guaiacum.

Tabaco.

Oil of Paper.

Spirit of Wine.

Brandy.

Queen of Hungary's Water.

Camphorated Spirit of Wine.

Laudanum.

Spirit of Nitre.

Applied to
the affected
Teeth.

*Against the Aphthæ, or, little Ulcers
of the Mouth.*

Spirit of Alom.

Spirit of Vitriol.

Spirit of Salt.

Spirit of Sulphur.

Vitriol of Cyprus.

Alom.

Applied
upon them
to dry them.

To cleanse the Blood.

Strawberry and Raspberry waters, the Dose is from half a spoonful to two spoonfuls.

Spirits of Strawberries and Raspberries, the Dose is from half a drachm to two drachms.

Tincture of Salt of Tartar, the Dose is from ten to thirty drops.

Spirit of Tartar, the Dose is from one drachm to three.

Volatile Salt of Tartar, the Dose is from six grains to fifteen.

Antimonium Diaphoreticum, the Dose is from six grains to thirty.

Stomachicum Poterii, the Dose is from six grains to thirty.

Spirit of Humane Head, the Dose is from four drops to twenty four.

Antiepilectick Elixir, the Dose is from four drops to twenty.

Bezoar

Bezoar Mineral, the Dose is from six to twenty grains.

Powder of Vipers, the Dose is from eight grains to thirty.

Volatile Salt of Vipers, the Dose is from two grains to fifteen.

Volatile Salt of Humane Blood, the Dose is from two grains to fifteen.

Extract of Aloes, the Dose is from fifteen grains to a drachm.

Elixir Proprietatis, the Dose is from seven to twelve drops.

Agrimony in Decoction.

Extract of Roses, the Dose is from half a drachm to two drachms.

Tartarum Vitriolatum, the Dose is from six grains to a scruple.

Lesser Centaury.

Against Diseases of the Lungs and Breast.

Sulphur drawn from the Cinnabar of Antimony, the Dose is from two to eight grains.

Oil of Bricks, applied externally.

Flower of Sulphur, the Dose is from ten to thirty grains.

Magistery of Sulphur, the Dose is from six to sixteen grains.

Balsom of Sulphur, the Dose is from one drop to six.

Sugarcandy.

Laudanum, the Dose is from half a grain to two grains, Oil

Oil of Acorns, the Dose is from two drachms to an ounce.

Bugloss in a Ptisan.

Veronica in a Ptisan.

Syrup of Tobacco.

Spirituons Hydromel, the Dose is half a glass.

Common Hydromel, the Dose is a glass.

Vulnerary Hydromel, the Dose is a small glass.

Antiepileptick Elixir, the Dose is from four to twenty drops.

Rose Water, the Dose is from one ounce to six.

Flowers of Benzoin, the Dose is from two to five grains.

Hydromel.

Olibanum, the Dose is from a scruple to a drachm.

To strengthen the Heart and Brain.

Strawberry and Raspberry waters, the Dose is from half a spoonful to two spoonfuls.

Spirits of Strawberries and Raspberries, the Dose is from half a drachm to two drachms.

Balm Water, the Dose is from two to six ounces.

Essence of Ambargrease, the Dose is from two to twelve drops.

Cinnamon Water, the Dose is from one drachm to three.

Oil, or Essence of Cinnamon, the Dose is one drop.

Tincture

Tincture of Cinnamon, the Dose is from half a drachm to two drachms.

Essence of Cloves, the Dose is from one drop to three.

Sal Volatile Oleosum, the Dose is from four to fifteen grains.

Spiritus Volatilis Oleosus, the Dose is from six to twenty drops.

The Jelly of Harts-horn in Meat.

The Conserve, Decoction, or Powder of Sage.

Betony in a Conserve, Decoction, or Powder.

Rose Water, the Dose is from one ounce to six.

Spirit of Roses, the Dose is from half a drachm to two drachms.

Orange Flower Water, the Dose is from a drachm to an ounce.

Stomachicum Poterii, the Dose is from six grains to thirty.

Spirituons Hydromel, the Dose is half a glass.

Queen of Hungary's Water, the Dose is from one drachm to two.

Compound Magisterial Balm Water, the Dose is from a drachm to an ounce.

To strengthen the Stomach.

E*ssence of Cloves*, the Dose is from one drop to three.

Essence of Cinnamon, the Dose is one drop.

Cinna-

Cinnamon Water, the Dose is from one drachm to three.

Tincture of Cinnamon, the Dose is from half a drachm to two drachms.

Mace, the Dose is from six grains to a scruple.

Oil of Nutmegs, applied externally, and given internally, the Dose is from four to ten grains.

Queen of Hungary's Water, the Dose is from half a drachm to two drachms.

Tincture of Salt of Tartar, the Dose is from ten to thirty drops.

Elixir Proprietatis, the Dose is from seven to twelve drops.

Extract of Aloes, the Dose is from fifteen grains to a drachm.

Wormwood in a Decoction.

Water of Nuts, the Dose is from one ounce to seven.

Compound Magisterial Balm Water, the Dose is from a drachm to an ounce.

Extract of Nuts, the Dose is from a scruple to a drachm.

Sage in a Conserve, and in Decoction.

Wormwood.

Spirit of Roses, the Dose is from half a drachm to two drachms.

Rose Water, the Dose is from one ounce to six.

Conserve of wild Roses.

Rhubarb, the Dose is from half a scruple to a drachm.

Extract of Rhubarb, the Dose is from ten grains to two scruples.

Mint.

Stoma-

Stomachicum Poterii, the Dose is from six grain^s to thirty.

Orange Flower Water, the Dose is from a drachm to an ounce.

Spirituons Hydromel, the Dose is half a glass.

For the Stoppage of the Terms in Women,
and for the Jaundice.

The *Aperitive Saffron of Mars*, the Dose is from ten grains to two scruples.

Salt of Mars, the Dose is from four to twelve grains.

Tincture of Antimony, the Dose is from four drops to twenty.

Antikefticum Poterii, the Dose is from ten grains to two scruples.

Tincture of Mars, the Dose is from a drachm to half an ounce.

Extract of Aperitive Mars, the Dose is from ten grains to two scruples.

Soluble Tartar of Mars, the Dose is from ten grains to half a drachm.

Volatile Spirit of Sal Armoniack, and of Urine, the Dose is from six drops to twenty.

Soluble Tartar, the Dose is from fifteen grains to a drachm.

Tartarum Vitriolatum, the Dose is from ten to thirty grains.

Spirit of Turpentine, the Dose is from four to ten drops.

Volatile

Volatile Salts of Vipers, Harts-horn, Urine, Tartar, the Dose is from six to sixteen grains.

Cinnamon Water, the Dose is from one drachm to three.

Tincture of Cinnamon, the Dose is from half a drachm to two drachms.

Nutmegs grated in Broth.

Balm Water, the Dose is from one ounce to six.

Lesser Centaury.

Magisterial Balm Water, the Dose is from a drachm to an ounce.

Spirit of Humane Head, the Dose is from four to twenty four drops.

Extract of Balm, the Dose is from a scruple to a drachm.

Elixir proprietatis, the Dose is from seven to twelve drops.

Tinctures of Saffron and Castor, the Dose is from four to twelve drops.

Myrrhe, the Dose is from ten grains to two scruples.

Tincture of Myrrhe, the Dose is from six drops to fifteen.

Spirit of Cresses, the Dose is from fifteen drops to a drachm.

Spirit of Scurvygrass, the Dose is from six drops to twenty.

Extractum Panchymagogum, the Dose is from one scruple to two.

Sal Volatile Oleosum, the Dose is from four grains to fifteen.

Spiritus Volatilis Oleosus Aromaticus, the Dose is from six to twenty drops.

Extract of Aloes, the Dose is from a scruple to a drachm;

F f f

Agauyē

Against Vapours and Palpitations.

M *Ugwort in Decoction.*
Volatile Spirits of Sal Armoniack and Urine,
 the Dose is from six to twenty drops.

Spirits of Salt of Nitre Dulcified, of Vitriol of Sulphur, the Dose is from four to eight drops.

Sal Polychrestum, the Dose is from half a drachm to six drachms.

Salt of Sulphur, the Dose is from ten grains to two scruples.

Magisterial Balm Water, the Dose is from a drachm to an ounce.

Spirit of Humane Head, the Dose is from four to twenty four drops.

Oil of Humane Head, the Dose is from one drop to six put up the Nose.

Antiepileptick Elixir, the Dose is from four drops to twenty.

Volatile Salt of Ambar, the Dose is from four to sixteen grains.

Crystal of Tartar, the Dose is from half a drachm to three drachms.

Rectified Oil of Ambar, the Dose is from one drop to four.

Queen of Hungary's Water, the Dose is from half a drachm to two drachms.

Volatile Salts of Vipers, Harts-Horn, Urine, Tartar, the Dose is from six to sixteen grains.

Cinnamon Water, the Dose is from one drachm to three.

Tincture of Cinnamon, the Dose is from half a drachm to two drachms.

Tincture

Tincture of Antimony, the Dose is from four drops to twenty.

Antihæcticum Poterii, the Dose is from ten grains to two scruples.

Water for Gun-shot Wounds to Excite the Senses.

Sage in a Conserve, or in Decoction.

Orange-Flower Water, the Dose is from a drachm to an ounce.

Elixir Proprietatis, the Dose is from seven to twelve drops.

Tincture of Peruvian Bark, made with Wine or Water, the Dose is from one ounce to four.

Tincture of Myrrhe, the Dose is from six drops to fifteen.

Sal Volatile Oleosum Aromaticum, the Dose is from four grains to fifteen.

Spiritus Volatilis Oleosus Aromaticus, the Dose is from six drops to twenty.

Oil of Bricks applyed Externally, and given Internally, the Dose is from two drops to four.

Rosin of Ambar, the Dose is from six grains to fifteen.

Oil of Camphire, the Dose is from two drops to six.

Camphire, the Dose is from one grain to six.

Tinctures of Castor and Saffron, the Dose is from four to twelve drops.

Spirit of Wine Camphorated, the Dose is from two drops to eight.

Balm or Mugwort Water, in which Burning Camphire has been extinguished five or six times, the Dose is from one ounce to six.

You may also hold to the Nose the thick Oil of Ambar, the Volatile Oil of Sal Armoniack, Spirit of Urin, Queen of Hungary's water, Camphire, Oil of Paper, Oil of Gum Ammoniack.

To help Delivery. and to bring forth
the After-birth.

OIL of Ambar, of Guaiacum rectified, the Dose is from two drops to six.

Volatile Spirits of Sal Armoniack and Urine, the Dose is from six to twenty drops.

Water of Harts-head, the Dose is from one ounce to four.

Wormwood in Decoction.

Birthwort in Decoction.

Orange-Flower water, the Dose is from a drachm to an ounce.

Volatile Salts of Vipers, Harts-horn, Urine, Tartar, the Dose is from six to sixteen grains.

Queen of Hungary's Water, the Dose is from half a drachm to two drachms.

Cinnamon Water, the Dose is from one drachm to three.

Tincture of Cinnamon, the Dose is from half a drachm to two drachms.

Essence of Cinnamon, the Dose is one drop.

Tincture of Silver, the Dose is from six to sixteen drops.

Magisterial Water of Balm, the Dose is from a drachm to an ounce.

Spirit

Spirit of Humane head, the Dose is from four to twenty four drops.

Oil of Humane Head, the Dose is from one drop to six.

Spiritus Volatilis Oleosus, the Dose is from six drops to twenty.

Elixir Proprietatis, the Dose is from seven to twelve drops.

Myrrhe, the Dose is from ten grains to two scruples.

Tincture of Myrrhe, the Dose is from six drops to fifteen.

Nutmegs, Mace, the Dose is from ten grains to a scruple.

Salt of Tartar, the Dose is from six to twenty grains.

Extract of Balm, the Dose is from a scruple to a drachm.

Soluble Emetick Tartar, the Dose is from four to twenty grains.

Soluble Tartar of Mars, the Dose is from ten grains to half a drachm.

Extractum Panchymagogum, the Dose is from one scruple to two.

Extract of Aloes, the Dose is from a scruple to a drachm.

Tincture of the Salt of Tartar, the Dose is from ten to thirty drops.

Tincture of Castor and of Saffron, the Dose is from four to twelve drops.

Fff 3

Against

Against Ulcers of the Bladder and Womb.

Spirit of Turpentine, the Dose is from four drops to twelve.

Volatile Salt of Ambar, the Dose is from four to fifteen drops.

Spirit of Ambar, the Dose is from eight drops to twenty four.

Clear Oil of Ambar, the Dose is from one drop to six.

Oil of Wax, the Dose is from two drops to ten.

Salt of Sulphur, the Dose is from half a scruple to two scruples.

Spirit of Nitre dulcified, the Dose is from four to eight drops.

Against the Windy Colick.

OIL of Aniseed, the Dose is from one drop to six.

Nutmegs grated in Broth.

Mace, the Dose is from ten grains to a scruple.

Oil of Nutmegs, the Dose is from four grains to ten.

Spirit of Nitre dulcified, the Dose is from four to eight drops.

Volatile Spirit of Sal Armoniack, the Dose is from six drops to twenty.

Tincture

Tincture of Ambar, the Dose is from ten grains to a drachm.

Acorns and their husks, the Dose is from one scruple to four.

Acorns of Oak, the Dose is from two drachms to an ounce.

Cinnamon Water, the Dose is from one drachm to three.

Essence of Cinnamon, the Dose is one drop.

Tincture of Cinnamon, the Dose is from half a drachm to two drachms.

Extract of Balm and Carduus Benedictus, the Dose is from a scruple to a drachm.

Tartarated Spirit of Wine, the Dose is from one drachm to two.

Queen of Hungary's Water, the Dose is from one drachm to two.

Mint.

Spirituos Hydromel, the Dose is half a glass.

Magisterial Balm Water, the Dose is from a drachm to an ounce.

Antiepileptick Elixir, the Dose is from four to twenty drops.

Extract of Aloes, the Dose is from fifteen grains to a drachm.

Extractum Panchymagogum, the Dose is from one scruple to two.

Falap, the Dose is from a scruple to a drachm.

Volatile Salts of Tartar, Vipers, Harts-horn,

Urine, the Dose is from four to sixteen grains.

Fff 4

Against

*Against the Stone in the Kidneys,
Bladder and Gravel.*

SALT of Mars, the Dose is from four to sixteen grains.

Tincture of Mars, the Dose is from a drachm to half an ounce.

Extract of Aperitive Mars, the Dose is from ten grains to two scruples.

Philosophick Spirit of Vitriol, the Dose is from four to twelve drops.

Spirit of Salt, the Dose is from four to eight drops.

Spirit of Cresses, the Dose is from fifteen drops to a drachm.

Spirit of Scurvygrass, the Dose is from six drops to twenty.

Conserve of Cynorrhodon.

Spirit of Nitre dulcified, the Dose is from four drops to eight.

Sal Polychrestum of Rochelle, the Dose is from one drachm to six.

Salt of Sulphur, the Dose is from ten grains to two scruples.

Acid Spirit of Sal Armoniack, the Dose is from four to eight drops.

Spirits of Vitriol and Sulphur, the Dose is from four drops to eight.

Spirit of Wax, the Dose is from ten drops to thirty.

Oil of Wax, the Dose is from two drops to ten.

Volatile

Volatile Salt of Ambar, the Dose is from four grains to sixteen.

Spirit of Ambar, the Dose is from ten drops to twenty four.

Spirit of Paper, the Dose is from six drops to twenty.

Soluble Tartar, the Dose is from ten grains to half a drachm.

Soluble Tartar of Mars, the Dose is from ten grains to half a drachm.

Soluble Emetick Tartar, the Dose is from four grains to twenty.

Laudanum, the Dose is from half a grain to two grains.

Spirit of Turpentine, the Dose is from four to twelve drops.

Spirit of Gum Armoniack, the Dose is from four drops to sixteen.

Crystal Mineral, the Dose is from a scruple to a drachm.

Against the Bilous Colick.

Salt-peter purified, or *Crystal Mineral*, the Dose is from a scruple to a drachm.

Sal Polychrestum of Rochelle, the Dose is from one drachm to six.

Spirits of Vitriol, Sulphur, dulcified Nitre, the Dose is from four to eight drops.

Soluble Tartar, the Dose is from a scruple to a drachm.

Salt of Sulphur, the Dose is from half a scruple to two scruples,

Tartar

Tartar Vitriolated, the Dose is from ten grains to half a drachm.

Against the Sciatica.

Spirit of Wine.

Queen of Hungary's Water.

Oil of Turpentine.

Urine.

Applied
externally.

Spirit of Urine and Sal Armoniack.

Antiepileptick Elixir, the Dose is from four to twenty four drops.

Jalap, the Dose is from a scruple to a drachm.

Rosin of Jalap, the Dose is from four grains to twelve.

Extract of Aloes, the Dose is from a scruple to a drachm.

Extractum Panchymagogum, the Dose is from one scruple to two.

Tartar Vitriolated, the Dose is from ten grains to half a drachm.

Soluble Tartar, the Dose is from a scruple to a drachm.

Salt of Sulphur, the Dose is from half a scruple to two scruples.

Spirit of Salt, the Dose is from four to eight drops.

Lesser Centaury.

Against

Against Corns of the Feet.

A *Rfenick.*
Infernal Stone.

Against the Caries of Bones.

O *IL of Camphire.*
Oil of Guaiacum.
Oil of Paper.
Oil of Caustick Antimony.
Oil of Honey.

To make the Hair grow.

B *Randy.*
Water of Honey.

Against Burnings.

S *Pirit of Wine.*
Queen of Hungary's water.

For Diseases of the Eyes.

F *Ennel.*
Lesser Comfry.
Plantane.
Brandy.

Queen

Queen of Hungary's Water.

Salt of Saturn.

Rose Water.

Water of Rose husks.

Tincture of Ambar distilled.

Olibanum.

To excite Seed.

Ambargrease, the Dose is from half a grain to four grains.

Essence of Ambargrease, the Dose is from six to twelve drops.

Compounded Magisterial Balm Water, the Dose is from a drachm to an ounce.

Nutmegs, Mace, the Dose is from ten grains to two scruples.

Oil of Nutmegs, the Dose is from four grains to ten.

Cloves.

Oil of Cloves, the Dose is from one drop to three.

Essence of Rosemary, Thyme, Lavender, the Dose is from one drop to six.

Essence of Cinnamon, the Dose is one drop.

Spirit of Cresses, the Dose is from fifteen drops to a drachm.

Spirituus Hydromel,

Against

Against the Gripping of Women in Delivery.

A Corns of Oak, and their Husk, the Dose is from one scruple to four.
 Oil of Anise, the Dose is from one drop to six.
 Oil of Nuts, one ounce in a Clyster.
 Oil of Acorns of Oak, the Dose is from two drachms to an ounce.

Against Madnes.

Speedwel.

Lesser Centaury.

Mint.

Sage.

Betony.

Plantain.

Mugwort.

St. John's Wort.

Wormwood.

Balm.

Vervin Mallow.

Powder of Vipers, the Dose is from eight grains to half a drachm.

Powder of Toads, the Dose is from eight grains to two scruples.

Volatile Salts of Animals, of Sal Armoniack, of Ambar, the Dose is from four grains to fifteen.

Sal Volatile Oleosum, the Dose is from four to fifteen grains.

Spiritus

Spiritus Volatilis Oleosus, the Dose is from six to twenty drops.

Tincture of Mars, the Dose is from three drops to fifteen.

Tincture of Antimony, the Dose is from four drops to twenty.

Ens Veneris, the Dose is from six grains to a scruple.

Spirit of Venus, the Dose is from four to ten drops.

Compound Magisterial Balm Water, the Dose is from a drachm to an ounce.

Antiepileptick Elixir, the Dose is from four to twenty drops.

Snuffs or Remedies which cause Sneezing.

T *Abaco in Round Powder.*

Betony in Round Powder.

Sage in round Powder.

White Hellebore Root in Round Powder.

Volatile Spirit of Sal Armoniack.

Spiritus Volatilis Oleosus.

Queen of Hungary's Water.

Brandy.

Spirit of Wine.

Cloves in Round Powder.

Gun-shot wound Water.

For the Hiccough.

Antiepileptick Elixir, the Dose is from four to twenty drops.

Laudanum, the Dose is from half a grain to two grains.

Volatile Salts of Harts-horn, Vipers, Humane Skull, the Dose is from four grains to sixteen.

Spiritus Volatilis Oleosus, the Dose is from six drops to twenty.

Elixir Proprietatis, the Dose is from four drops to twelve.

Cinnamon Water, the Dose is from one drachm to three.

Oil or Essence of Cinnamon, the Dose is a drop.

Tincture of the Salt of Tartar, the Dose is from six to thirty drops.

Volatile Spirit of Sal Armoniack, the Dose is from six drops to twenty.

Fixt Salt of Tartar, the Dose is from twenty to thirty grains.

Extract of Aloes, the Dose is from half a scruple to a drachm.

Extractum Panchymagegum, the Dose is from ten grains to two scruples.

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F I N I S.

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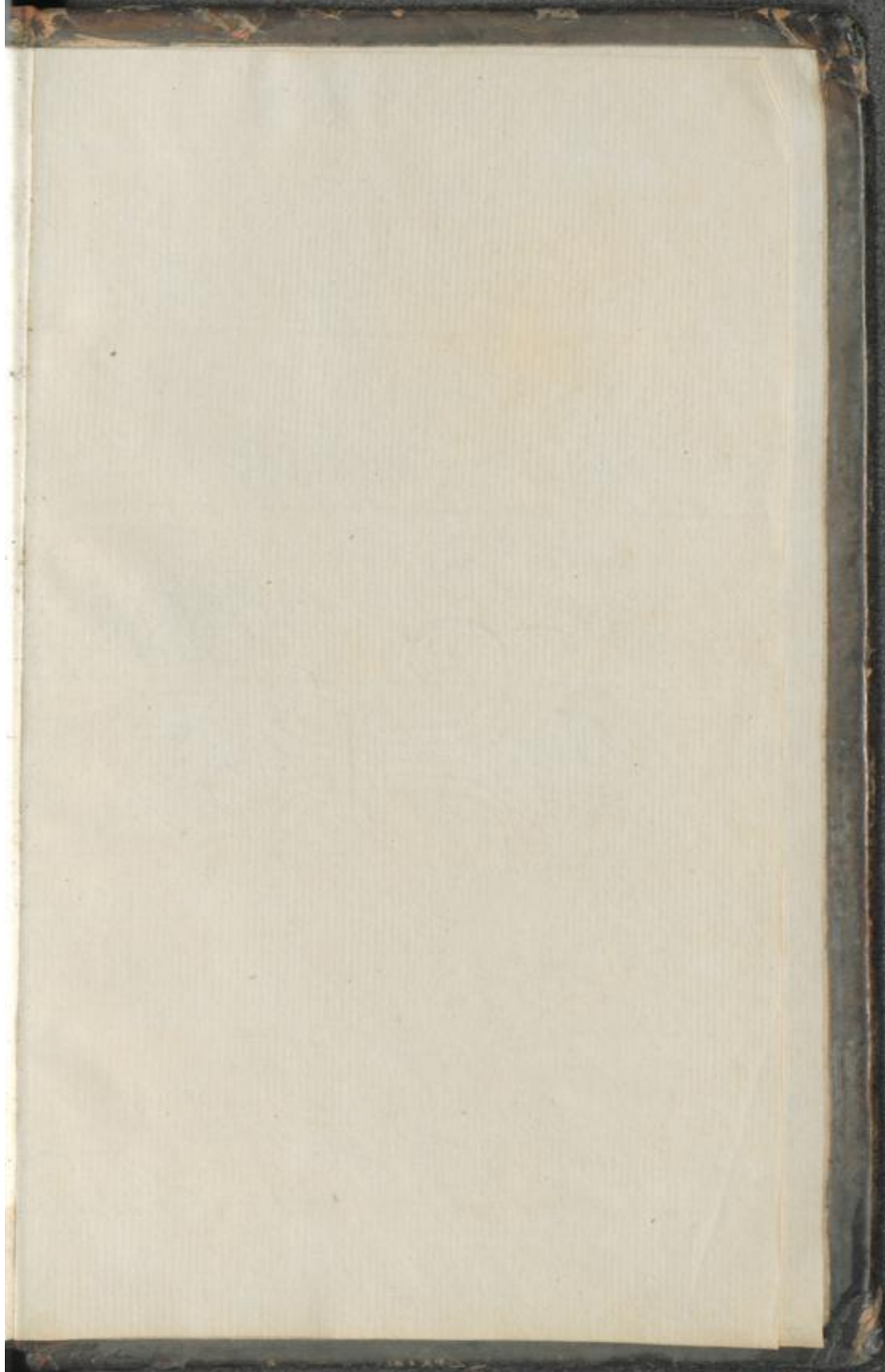
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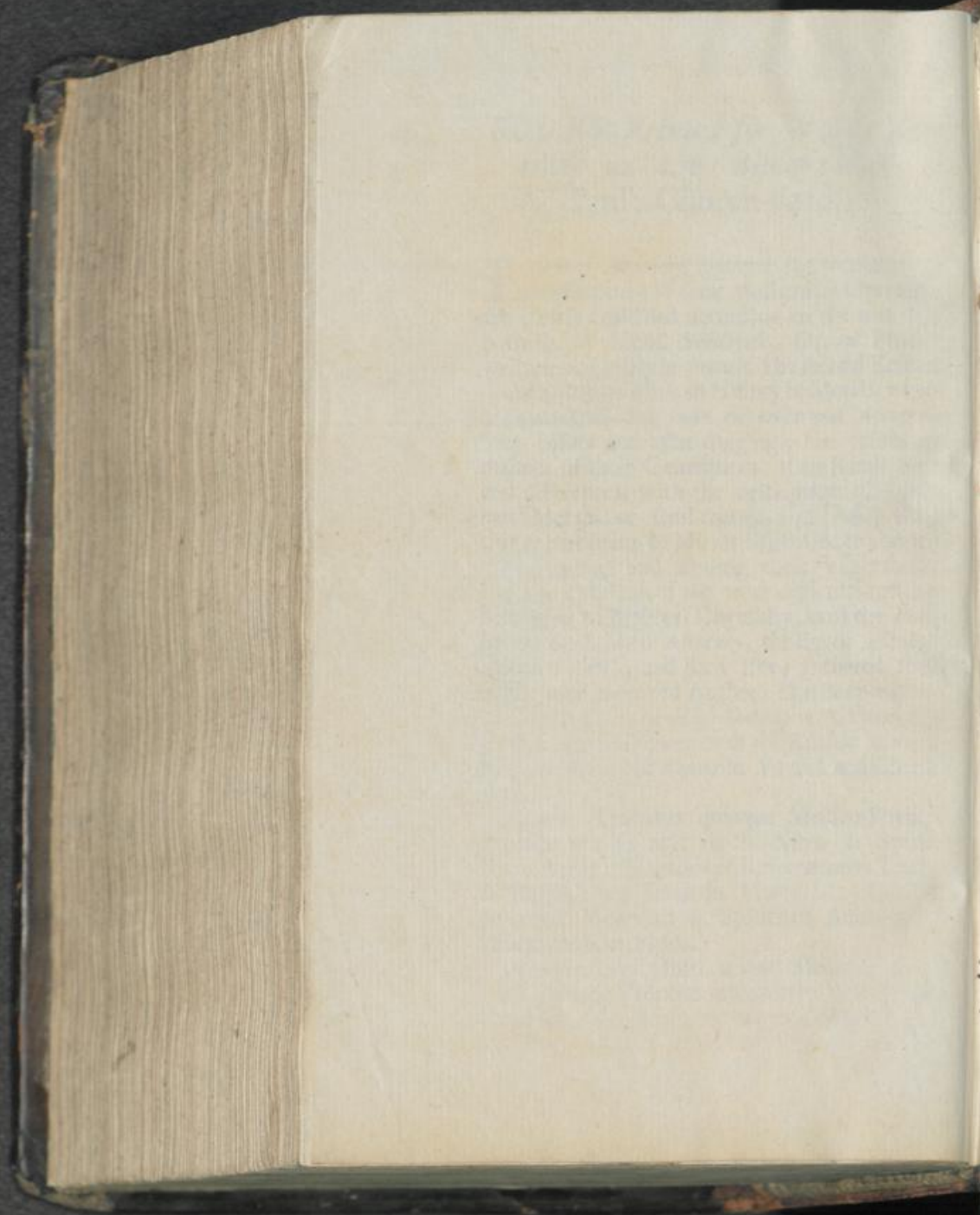
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Mayow Tractatus quinque Medico-Physici; quorum primus agit de *Sal-Nitro & Spiritu Nitro-Aereo*: Secundus de *Respiratione*: Tertius de *Respiratione fœtus in Utero*, &c. Quartus de *motu Musculari & Spiritibus Animalibus*: ultimus de *Rhachitide*.

Fraderici Loffii Observationes Medicinales.

D. Jonas de *Febribus intermittentibus*, in quo obiter *Febris continuæ natura explicatur*.





Q

